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RUBBER IN NATIONAL DEFENSE.

THE United States has at last been constrained irrevocably to take her place in the battle line of democracy. Freedom of the seas, a principle of vital impo. t~ the rubber industry, is the immediate cause that rendered the policy of armed neutrality inadequate; but the great decision has a far broader significance. America realizes at last that the fight is one in which she must not fail to participate.

In his epochal war message President Wilson made it plain that this nation has no quarrel with the German people; that it has no territorial, monetary or other selfish ambitions, but as a great champion of human liberty, individual rights and the brotherhood of man, has drawn the sword—to paraphrase the words of the immortal Lincoln—"that the *world* shall, under God, have a new birth of freedom, and that government of the people, by the people, for the people shall not perish from the earth."

Since we must fight in defense of a cause worthy of our best traditions, indeed the greatest that ever engaged human endeavor, let the war be prosecuted with all vigor and thoroughness, that there may the sooner be a conclusive peace. Our first contribution to the cause of world freedom will be economic. America's great wealth and vast mineral, agricultural and manufacturing resources can be drawn upon immediately, while her navy has already assumed its share in keeping open the world's shipping lanes. Meanwhile, great armies must be trained and equipped, and through the more elastic medium of wooden ships the steel tonnage that has been destroyed must be hastily replaced.

Most of the larger industrial plants, rubber mills among the first, have been placed at the command of the government; organized labor has pledged its hearty support, and operatives of all sorts have taken up military training. Such industrial preparedness is of prime importance and, profiting by the early experience of our allies, America must not sacrifice her chemists, engineers, skilled mechanics or other trained executives and workmen in the industries vital to national defense. No one can read the summary of the manifold and indispensable uses of rubber in warfare on another page and fail to realize that many rubber experts must be numbered among those exempted from enlistment. Fortunately this is recognized by the Council of National Defense, and the policy of selective conscription on the principle of universal liability to service, advocated by the War Department, is an expression of it.

Let skilled rubber men organize for home guard duty, but not in their loyalty respond too hastily to the call for volunteers and forsake the equally important mission of military equipment to which their experience better fits them. The government will call individually for those whose plain duty lies at the front, while all who remain to supply the enormous demand for many varied rubber manufactures, without which untold troops would be of no avail, will have served their country well and taken an honorable and necessary part in the world's fight for liberty and enduring peace.

MAKING AMERICAN CITIZENS IN RUBBER FACTORIES.

THE Rubber Association of America is cooperating with the Immigration Committee of the Chamber of Commerce of the U. S. A. to encourage Americanization of our foreign-born population. The movement is patriotic as well as commercial and deserves the hearty support of the rubber and allied industries. A certain result of the war will be an enormous shifting of workmen who must be replaced. Therefore, to raise the efficiency of each and every one to the utmost becomes at once a safeguard in national defense and industrially a precautionary benefit alike to employer and employe.

Happily, rubber manufacturers have long been among the leaders in welfare work, which has in recent years expanded tremendously, offering congenial occupation for the spare moments of those who had few advantages in youth. Partly an expression of the desire for maximum efficiency through advancement of men from the ranks to responsible positions, it is also in large measure an embodiment of the American spirit which welcomes the alien to our shores and encourages him to enjoy American institutions with us. The feeling grows that we owe more than a day's wage to those men and women who have chosen America as the place in which to work out their destiny and who have crossed the ocean to make it their home.

This social obligation is recognized and being met in the principal factories and many others of lesser importance. Club rooms and even club houses are being provided with restaurants, rest, reading and music rooms; auditoriums for lectures, entertainments and motion pictures; libraries of rubber and educational books and magazines; game rooms, swimming pools and sanitary conveniences; hospitals and free dental service. Outdoors there is often a field and grandstand for baseball, football and other athletic games. These benefits conserve health, promote a high moral standard, and, together with periodicals published in the interests of the employes, broaden acquaintance, keep all in touch with the news of the plant, and encourage firm spirit and team work.

Every man is urged to improve his education, and aliens are encouraged to become American citizens. Free evening instruction is provided in several instances, and foremen have instructions to tell aliens of the free evening classes of the public schools and, wherever available, of the correspondence courses of the state university extension service. Both the Y. M. C. A. and the Y. W. C. A. are active in social, religious and educational benefits, and the Boy Scout movement is claiming many of the more youthful operatives. Every man is made to understand that education means advancement and that long service is rewarded by annuity. The increase in capital stock of several companies and the reduction in par value to $10 a share is enabling some of the workmen to invest their savings profitably, while others are embracing opportunities afforded them by their employers to buy home sites and houses on easy, advantageous terms.

The manner in which our foreign cousins are responding to these influences for betterment is very gratifying. It is to be expected, however, that enthusiasm will sometimes lag in the schoolroom after eight hours' labor in the factory. This is particularly true in English language classes, for the alien finds ours a difficult tongue to learn. Various means of stimulating renewed interest have been tried, but probably the most unique and successful is that of devoting several minutes of the class time every day to singing American patriotic songs to piano accompaniment. To see 200 aliens representing 18 nationalities joining heartily in singing "America" is indeed an inspiring sight that augurs well for the future.

AN ASSOCIATION FOR BETTER LEGISLATION.

IN the Associated Industries of Massachusetts the Bay State has an efficient and much-needed organization. Its membership comprises most leading manufacturers of the state, including several rubber, textile, machinery and footwear firms familiar to readers of this paper, who are cooperating in bringing the influence of intimate knowledge and expert experience to bear upon all proposed industrial legislation.

The active work of the association is divided between the Central Legislative and Technical Advisory Committees. The former reads the bills, decides upon the desirable action, and refers its recommendations to the Executive Committee for approval. It maps out the line of action at hearings, and assists and directs the work until the measure is finally disposed of.

The Technical Advisory Committee organizes technical boards representing every industry and composed of men well informed about manufacturing operations, whose duty it is to supply state boards, commissions and legislative committees with facts and expert information as to the probable workings of proposed rules or codes regulating factories, to assist in drafting new and perfecting existing codes, and report on their actual workings.

That the scope may be made broader and more liberal, a Council of Associations is being organized which will eventually be composed of one representative each, from the various business organizations, such as the National Metal Trades Association, the Boot and Shoe Association, etc. By such council and concerted action it will be possible to express very nearly the thought and sentiment of the entire business community of the commonwealth for constructive and defensive purposes.

GUMSHOE MARMALADE IN GERMANY.

THE daily press of late has been favoring us with several more or less accurate pictures of the food situation in beleaguered Germany. Some of the statements appeal to reason; others do not. Certain it is that substitutes of many sorts are in daily use. Nevertheless, we can hardly credit the recent assertion that wornout gumshoes treated with nitric acid, to which are added wood pulp, artificial seeds and a little chemical flavoring, now pass there as marmalade. We agree with the writer that this vague recipe suggests neither a savory nor a toothsome delicacy, but in Germany military needs ever take first place and rubber is far too scarce to feed to the populace. Rubber scrap and fatty waste are as precious as diamonds and gold nuggets in Germany today, and it is a safe bet that every available ounce of the former is reclaimed and utilized in the manufacture of army and navy equipment.

The Indispensability of Rubber in Warfare.

THE call to arms has come. Army and navy are preparing for action. Men are of little avail without munitions and equipment, among which rubber in one form or another has become indispensable. Never until the present international conflict has this substance played such an important part. Its manifold applications in modern warfare were described in detail by many papers in volumes 51 and 52 of THE INDIA RUBBER WORLD, but the vital importance of the rubber industry in equipping the army, navy, air service and Red Cross, second only to arming and feeding the nation's fighting forces, warrants a summary of its many ramifications at this critical time in American affairs.

TRANSPORT.

First, we may consider the requirements of an army, prepared for conflict upon land. To-day is the day of the automobile, the motor-cycle and the motor truck; the first two for quick travel of individuals or small parties from point to point, and the last to replace mules to draw munition and commissary wagons and artillery. All these require tires of rubber, a fact in itself by which is proven the almost absolute indispensability of rubber in the progress of armies. In this one use, the manufacture of tires, rubber is to-day almost as important as food and ammunition, for on rubber tires every other necessity is borne to the front.

ARMY EQUIPMENT.

Rubberized fabrics are in urgent demand. Waterproof covers for wagons, guns and gun carriages are needed in great quantities, while ground sheets, tent coverings, ponchos, and even accoutrements are made of coated fabrics. The manufacturer of sheeted cloth will find there are many uses in the army for his product, while new demands must constantly present themselves for this class of materials. The soldier must be provided with haversack, and fastenings for the same, and here rubber and fabric are taking the place of leather. This latter material, advancing in cost as it is diminishing in supply, is fast being replaced by rubber for the soling of boots and shoes, and the claim is made that the new fiber and rubber soles have advantages not only of longer wear, but of more flexibility, and a waterproof quality not possessed by leather. Trench warfare has made rubber boots necessary to prevent the serious illness that soldiers contract in these muddy ditches.

THE AIR FLEET.

To-day fighting is done not only on the land, but in the air, on the water, and even beneath it, and aircraft, warships and submarines all require rubber in so many and varied forms that it would be but slight exaggeration to say that none of these could exist without the precious gum.

No substance has been found which can replace rubber in the manufacture of balloon fabrics. While the double fabric which forms the bags for dirigibles and "blimps" has not yet been made absolutely impervious to the passage of gases, no other material which has otherwise been considered practicable, has approached it in this particular. The wheels are rubber tired. The aviators wear rubber clothing, that they may conserve their bodily heat when in the colder and more rarefied atmosphere of high altitudes, and many of these suits are capable of acting as life preservers, if the aviator falls in the water.

Much rubber is also employed in the making of respirating apparatus, enabling the airman to breathe while at these great heights. That new invention, the stabilizer, requires rubber for insulation, packing and tubing, while every airplane uses tubing or solid rubber for cushioning the operator's body from shock, and for protecting exposed parts liable to damage in alighting.

THE NAVY.

The battleship has so many rubber requirements that only a general mention can be made. It is a habitation for many hundred men, and as such needs all the appointments of a modern hotel or dwelling, with its plumbing, its electric wiring, etc.; all the accessories of a machine shop, with its gaskets, its washers, its tubing; all the requisites of a fortress, its shock absorbers, its rubber carpeting; all the fittings of a hospital, of which more hereafter, and besides these all the essentials of a metal body floating in water, which must be watertight in all its joints, while its bulkheads must be packed as strongly as steam boilers to withstand pressure in emergencies, and, of course, large amounts of hose are necessary.

THE UNDERSEA FLEET.

Many, indeed, are the rubber requirements of ships that sail the seas, and even more numerous those of the fleet which sails below the ocean's surface. There, surrounded on all sides by water, with pressure increasing with every foot of submersion, the most exacting necessity is the packing of all joints, the use of gaskets on all hatches, around the inlets and outlets of the torpedo tubes, and the joints of the torpedoes themselves. There are many buffers for the doors, and packings to make them waterproof. There must be packing around the periscope tubes, and around the lenses in them, and cushions to protect the observer's face from jars and bruises when using these necessary tubes. These submarines are usually propelled by electricity when submerged, and much rubber is used for insulation, to prevent leakage and short circuiting. Hundreds of hard-rubber battery jars must each have its tightly fitted rubber-sealed cover, and its enclosed rubber separators, while much sponge rubber is used in the elimination of gas and acid fumes from these batteries. The crews of some submarines are provided with life-saving suits of rubber to be used in the event of disability of the vessel to rise to the surface.

THE RED CROSS.

War consists primarily in the destruction of life, but a merciful adjunct to all branches of service is the hospital, be it in the field or on shipboard. The readers of this page are acquainted with the many surgical sundries and appliances used in every hospital, which are made wholly or partly of hard or soft rubber. There is no need of their enumeration here. With our forces in action all such supplies will be needed in great quantities.

MUNITIONS MANUFACTURE.

Rubber also plays an important part in the manufacture of modern high explosives. The chemicals used in their production require careful handling, the health, and often the lives of the operatives depend upon the rubber gloves, aprons and boots they wear. And if the materials are full of danger, how much more so the explosives, when manufactured, and here the requirements regarding metal-less footwear are compulsory.

ARTIFICIAL RESPIRATION.

In all these branches of service there are vicissitudes when resuscitation may be necessary. The airman may lose his breath because of rarefied atmosphere or swift descent; the soldier may be subjected to gas attacks, the sailor to drowning, the submarine sailor to noxious fumes, and all of them to sudden severe nervous shock, which may be fatal unless artificial respiration is quickly available. The many kinds of apparatus for such purposes are all more or less dependent on rubber for tubing, gas bags and inhalers. And here might also be mentioned the gas helmets and oxygen breathing apparatus furnished soldiers likely to be assaulted by gas attacks of the enemy.

This is far from being a complete list of the various forms in which rubber is required in modern warfare. Few, if any, industries are more important than our own in the present emergency. That the rubber manufacturers of this country are prepared to fill all these requirements is a source of satisfaction in this critical period of the nation's history.

THE PRESIDENT'S CALL TO INDUSTRY.

IN that significant proclamation to his fellow-countrymen issued April 15, President Wilson emphasized the vital importance of industrial America in bringing the war to a successful conclusion. In the performance of this great task calling for large service, great efficiency and much self-sacrifice, the industrial forces of the country will become, he asserts, "a notable and honored host engaged in the service of the nation and the world, the efficient friends and saviors of free men everywhere."

It is in this spirit that the Council of National Defense has sought the active cooperation of producers of raw materials and manufacturers in meeting wartime needs promptly, adequately and well. Agreements have already been made with steel and copper producers, under which the Government is guaranteed all of these materials required for war purposes at prices far below the prevailing market. Negotiations are now in progress with oil and other producers, while an agreement with the rubber industry is foreshadowed in the appointment of a committee of rubber men to act in conjunction with the Committee on Raw Materials of the Council of National Defense. The new body, all good men and practical, consists of A. H. Marks, vice-president of The B. F. Goodrich Co., Akron, Ohio; Frederic C. Hood, vice-president and general manager Hood Rubber Co., Watertown, Massachusetts; H. Stuart Hotchkiss, vice-president General Rubber Co., New York City. Its announced purpose is to secure a speedy and adequate supply of rubber at prices which will permit no excess profits on government orders during this period of national emergency.

Agreements, such as those already negotiated, to furnish military equipment at prices which investigation shows to be reasonable, will not only insure maximum results from the nation's great war appropriations, and make purchases possible without competition, but will render it unnecessary to take over any plants for government operation. The large output of rubber manufactures already at Government disposal, indicates that the rubber industry as a whole places the national defense above profit or material advantage and will welcome any reasonable scheme for government cooperation.

PREPAREDNESS ACTIVITIES IN THE TRADE.

THE Pennsylvania Rubber Co., Jeannette, Pennsylvania, in response to the appeal of President Wilson for an increased production of foodstuffs, has turned over to its employes the extensive acreage surrounding its large plant. The company will do the ploughing and cultivating and each employe will look after the crop on his section during the season, and receive the profit when it is marketed.

Van Cleef Bros., Chicago, manufacturers of rubber cement, are utilizing a vacant space about their plant to interest their employes in raising foodstuffs. The company will lend every support possible and encourage their help, the employes to have all the crops.

Reports of the commandeering of manufacturing plants by the Government have appeared in local papers owing to activities of the five engineering associations in connection with the Naval Consulting Board, the object being to list the industrial resources of the country and insure the services of skilled men in manufacturing material for the use of the Government. Among the establishments erroneously reported to be commandeered was the Cutler-Hammer Manufacturing Co., Milwaukee, Wisconsin, of which General Manager A. W. Berresford is a member of the Naval Consulting Board. He states that of the 2,000 employes, 400 shop men and 40 in the testing room engineering and office forces are enlisted in the Reserve, and may be called upon to do Government work in this factory, but this will not interfere with the regular business, and normal shop conditions.

Reports of like nature regarding several Akron, Ohio, concerns were found on investigation to be of a similar nature, the stories of commandeering the plants resulting from the taking of inventory and stock by Federal agents. The B. F. Goodrich Co. employes to the number of 1,000 have joined this Reserve, thus pledging themselves to work on Government contracts when needed. The Goodyear Tire & Rubber Co. reports that it has arranged for classes in military training, giving all employes an opportunity to learn under the auspices of ex-army officers.

C. P. Mader, secretary, Bucyrus Rubber Co., Bucyrus, Ohio, is captain in the Quartermaster Officers Reserve Corps, and for several years has been chairman of the military committee of the Bucyrus Chamber of Commerce. A number of the employes have signified their intention of entering some branch of military service.

George E. Hall, vice-president and general manager, and J. W. Fellows, factory manager, of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, are prominently connected with the Public Safety Committee, and James H. O'Brien, superintendent, has joined the Home Guards. Over 160 employes of the company intend to enlist and 30 have already done so. A uniformed Home Guard is being organized, which will be a unit of the Cambridge Defense League.

Superintendent E. W. Dunbar, of the Apsley Rubber Co., Hudson, Massachusetts, is chairman of the Public Safety Committee of that town. President L. D. Apsley states that if the Government requires any Apsley goods these needs will have first attention, the regular customer and the profit having only secondary consideration.

The women in the making room of the Tyer Rubber Co., Andover, Massachusetts, started contributing weekly to the Red Cross and every department adopted the idea, and the result is that a large sum is sent weekly to the society. It has the financial support and cooperation of the officials of the rubber company.

The Cupples Co., St. Louis, Missouri, report that several employes have already enlisted, and that 150 young men are being instructed in military drill, the time being taken from the company's working hours.

COTTON GOODS MANUFACTURERS COOPERATING.

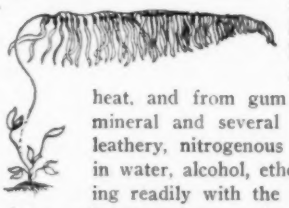
The committee on cotton goods industries appointed by the Advisory Commission of the Council of National Defense comprises Lincoln Grant, of Wellington, Sears & Co., chairman; W. D. Judson, of Parker, Wilder & Co., secretary; Fred. S. Bennett, of the William L. Barrell Co.; Spencer Turner and John E. Rousmaniere, of the J. Spencer Turner Co.; Fuller E. Callaway, cotton manufacturer, Lagrange, Georgia; Harry L. Baily, with Wellington, Sears & Co.., and A. F. Bemis, of the Bemis Bros. Bag Co., and president of the National Association of Cotton Manufacturers. This committee has sent a letter to the cotton mills of the country asking for information about the kind of goods turned out, number of looms, etc. It is said that the replies received have not been altogether satisfactory to the committee. Chairman Grant reports that many of the mills had expressed their willingness to cooperate, but that the majority of these were not equipped to turn out the kinds of goods most needed. It is understood that about 25 mills which can make these goods have yet to express their willingness to devote their looms to making goods required by the Government.

Kelp Might Provide a Rubber Plastic.

OFF the coast of southern California, a business new to the United States, and by no means devoid of interest to the rubber industry, has sprung up, and since last July achieved national importance. It is the extraction of potassium chloride for munition manufacture and the separation of various other by-products from certain large Algae or seaweeds, particularly *Macrocystis pyrifera*, known as kelp.

Those who have followed the interesting developments in the rubber trade for the past decade will perhaps recall that six or eight years ago companies were formed both in England and America for the manufacture of rubber from kelp. Nothing came of either venture. "The India Rubber Journal" manifested no faith in the British invention, and as stated in THE INDIA RUBBER WORLD, the stock-selling circular issued by the promoters of the American company indicated so conclusively their ignorance of rubber technology that the matter was never taken seriously by the trade. The sample sent for inspection looked very much like the compounded sheet and from a physical examination seemed to be the kelp product mixed with rubber dough.

Kelp, however, abounds in a thick, gluey liquid, known as algin, which possesses many useful properties. It slightly resembles gelatin, but differs from it in not coagulating to a jelly nor being precipitated by tannin; from albumin in not coagulating by heat, and from gum arabic in being precipitated by mineral and several organic acids. Algin gum is a leathery, nitrogenous substance, alginic acid, insoluble in water, alcohol, ether and glycerin, although combining readily with the lighter alkaline metallic bases to form substances many of which are soluble. Does this not suggest the possibility that in kelp there may be a plastic which the rubber trade can use? Solutions of algin have 14 times the viscidity of starch and 37 times that of gum arabic, rendering it excellent as a glue. As it combines easily with rubber, shellac and other gums, it can be made an important ingredient of waterproofing compounds for cloth. It can also be utilized as a thickener and for fixing iron and aluminum mordants in calico printing, and for emulsifying oils and clarifying wines and spirits.



With the heavier alkaline metallic bases, algin forms insoluble compounds as pliable as gutta percha or as tough as horn, in which latter state it may be turned and polished like ivory or the ivory nut. In thin, transparent sheets it offers a substitute for parchment paper, gutta percha, gelatin, celluloid, isinglass or artificial leather. Like celluloid, too, it may be used for the manufacture of buttons, combs, knife handles, etc. Indeed, of the four small kelp concerns at San Pedro, one at present makes such articles, while another turns out pails and similar utensils from the pulp, which is also excellent for the manufacture of paper.

In coast regions the world over, wherever kelp occurs, it has long been employed as a fertilizer, and until the close of the eighteenth century, formed the chief source of the supply of potash in western Europe. Kelp salt, the residual ashes of the seaweed after separation of the potash, contains sodium sulphate, carbonate and chloride, together with small quantities of potassium sulphate, and was formerly much used in the manufacture of glass and soap, but of recent years has been valuable almost solely as a source of iodine, which is an important constituent. Some bromine is also obtainable. Thus this industry is but a reversion with improved methods to a business of bygone days.

When the European war cut the United States off from the world's supply of potash, the mines near Stassfurt, Prussia, where carmallite and cænite are found in abundance, American scientists at once began to develop other sources. These minerals contain potassium and magnesium sulphate as well as magnesium chloride, and among the products obtained from them are saltpeter (potassium nitrate), the principal ingredient in the manufacture of gunpowder, and potassium chlorate, used in the arts as an oxidizing agent and essential to the manufacture of several high explosives. Both have been in such tremendous demand as to warrant the expenditure of millions of dollars in the development of the kelp industry and extensive experimental work for utilization of the by-products of potash manufacture.

Potash, or potassium carbonate, the so-called vegetable alkali, plays an important part in vegetable life, existing in all plants in varying proportions, and in various combinations with both inorganic and organic acids. When plants are burned, the inorganic constituents remain behind in the ashes, and it was by bleaching these ashes that potash was first obtained, the name being derived from the fact that the solutions from wood or other vegetable ashes were boiled down or concentrated in great iron pots.

Were potash the only consideration, this infant American industry would be but temporary, for in peace times it can be procured from the German mines more cheaply than in any other way; but so many useful by-products are made available through its manufacture from kelp by chemical extraction rather than burning that there is good prospect that the business will continue to be profitable after the war. Another vital factor in the choice of kelp rather than other potash-yielding plants is especially favorable. No vast acreage of valuable land must be devoted to its culture; there is no expense of planting, cultivation or combating insect pests. It grows wild in the sea along rocky shores and requires only to be cut and carried ashore for refining. The harvesting and manufacturing are the only costs, and the supply is seemingly inexhaustible. Being one of those flowerless plants never having true stamens and pistils, it propagates rapidly by spores or simple cell division.

KELP HARVESTER SHOWING ENDLESS DRAG CONVEYORS.

Kelp is found all along our Pacific Coast from Cedros Island, Lower California, to Alaska. The report of the Department of

Agriculture survey of these kelp beds in 1914 showed that there are available about 59,300,000 tons of kelp, if it were harvested semi-annually, or equivalent to 2,266,000 tons of potassium chloride. Our total imports of potash salts are about 1,000,000 tons, equivalent to 400,000 tons of potassium chloride.

The kelp groves are densest off Point Loma, San Nicholas Island, and San Clemente Island, due west from San Diego. The government report gives 16,000,000 tons of kelp on an area of 91 square miles from Cedros Island to San Diego, and 18,000,000 tons on an area of 97 square miles from San Diego to Point Concepcion. Thus the kelp industry has sprung up about San Diego, and the $175,000 government kelp plant and laboratory, under the direction of Dr. J. W. Turrentine, will be built there or at San Pedro.

There are three principal firms at San Diego working in as many different ways. The Swift Packing Co. has a $250,000 wharf and plant employing about 75 men, which is merely a temporary project for the duration of the war. The kelp is dried in nine large revolving drums by direct heat, then ground like feed, sacked and shipped for fertilizer. As 90 per cent of the kelp is water, the fertilizer yield by drying is 10 per cent.

The San Diego Kelp Ash Co. buys and sells the ash of burned kelp for fertilizer. The kelp is gathered and prepared by small independent companies or individuals, who sell the ash to the distributing company as a farmer sells his grain. The crude improvised implements with which the harvest of the sea is gathered, dried and burned, render this the most picturesque aspect of the industry, though of scant significance. Altogether about 100 of these independent workers prepare about 200 tons of ash a month, about 1½ tons of ash being produced from 20 tons of kelp.

Not these two concerns, but the activities of the Hercules Powder Co. have brought the kelp industry to the attention of the nation. This firm has expended $2,000,000 on a great plant to extract potash from kelp for the manufacture of munitions by means of chemical solutions. It covers 30 acres, includes a 2,300-foot wharf, and employs over 1,100 men in three shifts, 50 of them being expert chemists, engineers and superintendents. The payroll is said to be $70,000 to $80,000 a month. There are several buildings, such as a large still house, centrifugal drier house, huge filter press house, 2,700-horsepower steam plant, and numerous great storage tanks aggregating 12,000,000 gallons, including 156 wooden tanks of 50,000 gallons capacity each, used as digesters of the pulp.

For cutting the kelp and transporting it to the plant, three curious kelp harvesters, three tugs and nine barges are employed. Because of their unique character a peculiar interest attaches to these great sea-going mowing machines for cutting at a depth of six feet under water this giant seaweed, which often grows to a length of 100 to 200 feet, or considerably more. Resembling the familiar dredge, they are twin-screw barges with great cycle knives that work on a bar like a mower in front of the vessel. As the barge moves forward the kelp is gathered up on a screen and conveyed by an endless drag to the pits of the boat, where it is ground finely and transferred to the barges to be taken to the plant. A crew of 12 men operates and lives on each harvester.

The $20,000 harvester of the Swift Packing Co., 38 by 150 feet, differs in that the kelp, after being cut into pieces about six inches in length, is dropped into six large bins in the hold until taken to shore by the harvester itself. The mower consists of knives attached to an endless chain, and cuts a swath of 40 feet. This harvester has a capacity of 500 tons a day, although on account of unfavorable weather conditions and rough seas, which reduce the working day to four or five hours, does not average over 200 tons.

Numerous secret processes effect the change of kelp into potash, although most of the details are well known. First the macerated seaweed is allowed to ferment in great wooden tanks for 10 days. The coarse leaves are then screened off, and the liquor is pumped into vats, where a chemical solution is added. It is then boiled to kill the bacteria and run into large sediment vats to settle. From there the liquid goes through filter presses and the mud is left on the cloth of the press, while the liquor filters through. By means of multiple effect evaporators the water is removed from the liquor without precipitating the salts. Then by means of evaporation again, in large vertical tanks with conical bottoms, the salts are precipitated from the liquor into the chambers below and scraped out with a hoe. The potassium chloride, which is the starting point for the manufacture of other potash salts, is separated from the sodium chloride, or common salt, by crystallizing first at one temperature and then at another. As the potassium chloride is more soluble in hot than in cold water, whereas the sodium chloride is about equally soluble, the potassium salt accumulates in the cool vat and the sodium salt in the hot one. After several refining processes the chemically pure potassium chloride is scraped out from the chambers below the evaporating tanks, when the usual processes of converting this into other potash salts may be begun.

Besides potash and saltpeter for the manufacture of matches

PUMPING GROUND KELP FROM THE HARVESTER INTO A BARGE.

and various explosives, acetone, for the making of smokeless powder, and also iodine, are taken from the mother liquors, while the trailings or mud from the filter presses, which retains a small percentage of potash, is sold for fertilizer. No part of the three barge loads of kelp that pass through the plant daily go to waste, for science and inventive genius have found ways to utilize everything in the composition of kelp, and the experiments now in progress by the government, the Hercules and other companies, promise to develop still further uses, some of which may be closely allied with the rubber industry.

When the war is over and munition manufacture languishes, potash salts will not be in such great demand, and a greater percentage of the output of the kelp industry will be available for other uses. Why not a rubber plastic? Meantime nearly all of the immediate and later products of this new American industry are employed by rubber manufacturers as coagulants, solvents, compounding or vulcanizing ingredients with rubber, gutta percha or their substitutes; also in waterproofing and insulating mixtures, rubber reclaiming and the manufacture of artificial leathers. Therefore, a new source tending to insure an ample supply at moderate prices is of interest in itself, aside from future possibilities.

Making Seamless and Transparent Rubber Goods.

THE manufacture of seamless and transparent rubber goods in the United States has not experienced the unusual growth that has characterized other branches of the rubber industry. In the past this has been almost wholly due to the competition of German manufacturers, who were able to undersell the American producer, and thereby control the market. Now that this depressing competition has been removed, the manufacture of dipped goods will, doubtless, be developed to a much greater extent than ever before, and when American ingenuity is applied to this branch of the rubber business there will be small reason to fear competition from abroad. The demand for transparent and seamless rubber articles made by the dipping process has been greatly augmented during the past few years, and the production is not equal to the demand.

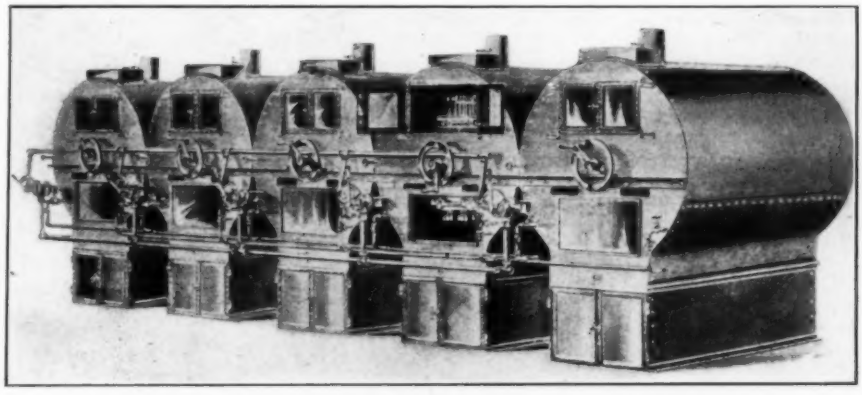


FIG. 1. MACHINES FOR MAKING DIPPED GOODS IN QUANTITIES.

In this country we are accustomed to view the art of dipping as an unavoidable hand process and, therefore, there has been little advancement made in specialized dipping machines. That Germany has taken precedence in dipped goods manufacture is a well-known fact, due, without question, to the labor-saving machinery of special design used in making goods of this type. In design and construction these machines are built for both large and small production, and with every possible operation being automatically controlled in order to conserve labor and reduce the cost of manufacture.

GERMAN METHODS.

In the manufacture of nipples, according to the German practice, Upper Congo, Mozambique, Para and Ceylon rubbers are used. In order to cheapen the article, rubber substitute is often employed, but the resultant product is dull in finish and requires varnishing or enameling. Red nipples are made from Ceylon rubber, colored with sulphuret of antimony, and for black nipples Para rubber is generally used without coloring matter of any sort. Ceylon rubber is unsuited to this type of nipple, as it produces a gray-blue color in the goods.

Benzene of high volatility is recommended, as the lower grades have a tendency to produce blisters. The solution is made in the ordinary vertical type of power-driven churn, although recently the Universal solution churn has come into more general use.

In the preparation of crude rubber for the manufacture of transparent goods the procedure is radically different from that of ordinary seamless goods. Para, Ceylon and Ceara mixed with African rubber of good quality may be used. Pale Ceylons are very satisfactory and the Brazilian sorts, when used alone, produce slightly opaque goods, but quite nervy, while with African rubber they are both softer and clearer. Inferior rubbers are not used in the making of transparent rubber goods. As heat makes the rubber opaque, the washing process is precluded and the rubber is cut in small pieces and dissolved in benzene in a solution mixer. The heavy impurities may be strained out, but the fine particles are removed by a settling process; the time required to produce a perfectly pure solution depending on the quality of the gum and the required thickness of the solution. The dipping forms may be of wood, porcelain or glass and the frames to which they are attached are all of standard size to fit the dipping machine carriers.

SCHIRM'S DIPPING MACHINES.

Seamless goods, such as toy balloons, nipples and gloves, transparent nipples, finger cots and tubes are all made on the machines here described; however, the preparation of the solution, and the drying and final vulcanization is quite different in the production of transparent articles. The machines for dipping and drying nipples and similar articles up to 180 millimeters [7.086 inches] in length are illustrated in Fig. 1 and consist of a battery of 5 machines. The detailed description that follows applies to each machine, as they are all alike in construction and operation. Moreover, the process of dipping and drying is progressively carried on, the machines being semi-automatic and under the control of one operator.

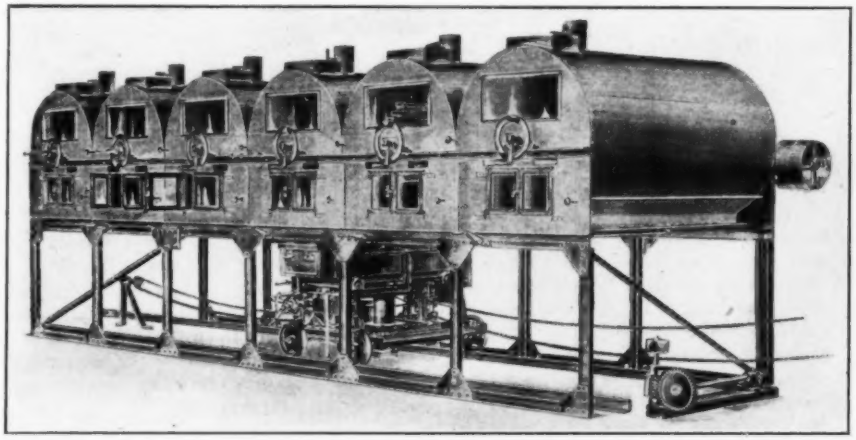


FIG 2. MACHINES FOR MAKING DIPPED GOODS WITH MOVABLE SOLUTION CAR.

The upper cylindrical casing encloses a horizontal shaft on

which are mounted four carriers that hold the four dipping frames. This shaft is revolved at variable speed by gearing located at the back of the machine, not shown in the illustration, and is started and stopped by a hand rod shown at the front on the left side of the casing. The lever in the center of the casing is used for turning the carrier shaft by hand when loading the carriers with the mold frames. Glass observation doors are provided in the upper part of the casing for introducing and removing the mold forms and there is also a glass window in the lower part, through which the dipping operation may be observed. Two additional glass-covered slits are located just above the lower window for observation purposes, and electric lights illuminate the interior of the casing.

The lower part of the casing is provided with doors and encloses a platform that is raised and lowered by a hydraulic ram. Two hinged covers are attached to the sides of the casing and are opened and closed automatically, covering the solution when not in use, thereby keeping it clean and preventing evaporation. A car containing the rubber solution is wheeled on the platform and the door closed. A frame holding the molds is then placed in the machine through the upper doors and attached to the carrier. The carrier shaft is turned by hand, bringing in position the second carrier to which the second dipping frame is attached, and when all four frames are in place, the doors are closed and the machine is ready for the actual dipping operation.

The speed of the hydraulic ram is controlled by a valve shown on the left of the machine, and when this is operated the ram slowly lifts the solution car and the hinged covers at the same time. After the first dipping the car is lowered and the carrier shaft turned until the wet molds occupy a vertical position. After remaining in this position for a short period to prevent the freshly-dipped molds from running, the carrier shaft is set in motion and revolved until the forms are surface dried. Then the second mold frame is dipped, raised to a vertical position and revolved until surface dried, followed by the third and fourth frames in a similar manner. When all the molds are sufficiently dried, the second dipping operation and, in fact, as many successive coatings as may be necessary, are commenced and finished in the above prescribed manner.

During the period in which this solution car is being automatically lowered and the forms revolved, the next machine may be operated, thus a skilled operator can manipulate several machines.

The drying is assisted by air heated to the proper temperature and passed through a dust removing apparatus, the circulation being regulated by suitable valves and induced by a ventilator. It is customary to devote certain machines to dipping only, and the molds, after being dipped, are removed to the machines that are used exclusively for drying purposes.

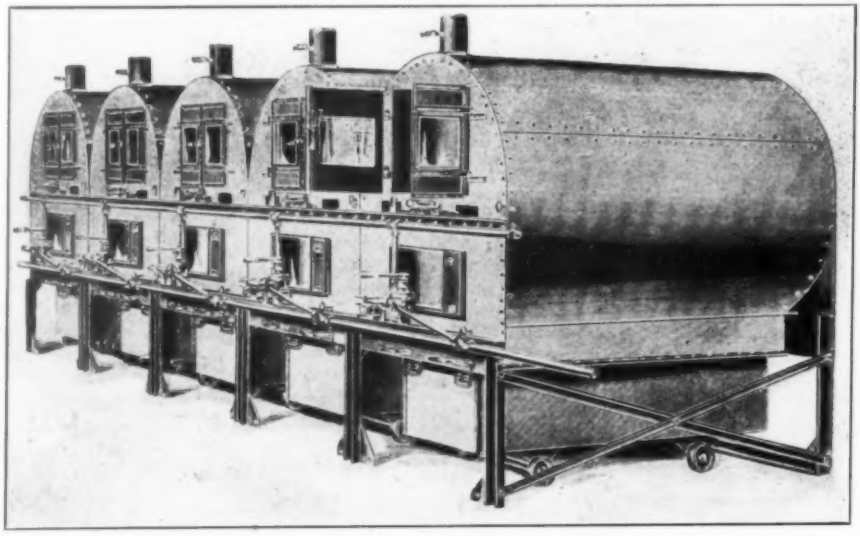


FIG. 3. DIPPING AND DRYING MACHINES FOR LONG SEAMLESS GOODS.

MACHINE WITH MOVABLE SOLUTION CAR.

To avoid making quantities of solution in smaller factories, where the desired output is not so great as that of the preceding machines, the apparatus shown in Fig. 2 is used. In this construction only one solution car is used that serves six machines by traveling on a track, being moved from one machine to the other by chain gearing. The hydraulic ram for lifting the solution car is operated by a hand pump and controlled by a valve shown at the front of the car. These machines possess the same mechanical features described in the machines shown in Fig. 1, and are capable of producing rubber articles 180 millimeters [7.08 inches] long. It is claimed that a skillful operator can produce 21,600 small and 10,500 large nipples on these six machines in one day.

MAKING LONG SEAMLESS GOODS.

In the manufacture of long seamless rubber articles, such as gloves, 350 millimeters [13.7 inches] long and even 450 millimeters [17.71 inches] long, the machines illustrated in Fig. 3 are used. The output of 5 machines of this type is claimed to be 3,360 pieces in one day, one man being able to attend to 10 machines with a daily product of 33,600 pieces.

After the dipping process comes the edging, or bead forming operation, which, in the majority of factories, is done by hand. The beaded goods are then placed in a moderately warm chamber and the following day they are vulcanized. The articles are cured on the molds in chloride of sulphur vapors, but thicker goods, such as nipples, etc., are first subjected to the vapor cure while on the molds, after which they are removed, turned inside out and cold cured.

As previously stated, the process of dipping and drying transparent goods is the same as in other seamless goods, but without heat, as the drying temperature should not exceed 20 degrees C. The goods are cold cured in the usual manner and afterwards dried in a cool, well-ventilated chamber.

THE EXCESS PROFITS DUTY.

Some fear exists among British rubber companies in the East that the excess profits tax may be increased and this uneasiness is not without effect on the rubber market. Companies likely to be taxed have made provision to cover excess liability, stating that part of it might be considered as a reserve to be available for distribution when the tax was withdrawn.

JAPANESE PLANTERS INVESTIGATING SUMATRA.

From the "Sumatra Post" it is learned that a representative of a Japanese association arrived on the east coast early this year, with the object of purchasing land in Atjeh and beginning rubber cultivation there.

Power Losses in Pneumatic Tires.

THE following abstract is from a paper by E. M. Lockwood, assistant professor of mechanical engineering, Sheffield Scientific School, Yale University. The tests were made on an apparatus for power measurement at the rear tires of an automobile, and for the purpose of measuring the internal friction losses of tires and transmission system when driven by an external source, a calibrated motor was attached to the drums. The experiments have the limitation of being made on one size of tire only, and no claim is made that the entire question of tire resistance has been solved.

The method of obtaining the rolling resistance was to anchor the car with either pair of wheels on the center of the test drums, and then rotate the latter by means of the calibrated motor. Two readings were needed, one with the car on the drums and one with the car removed, when the difference in power measures the rolling resistance of a pair of wheels. The available range of speed of the motor is from 20 to 40 miles per hour at the circumference of the drums, and its maximum power is 15 horse power. The diameter of the drums is such that 300 revolutions are equal to one mile.

ROLLING RESISTANCE AT VARIOUS SPEEDS.

One surprising result of all measurements of rolling resistance at speeds from 20 to 40 miles per hour has been the very slight increase of resistance at the higher speed.

As an example of the amount of variation of resistance with speed, the following tests are reported with readings exactly as recorded:

ROLLING RESISTANCE OF FRONT WHEELS.

Front Tires.	Inflation. Pounds.	Load. Pounds.	Rolling Resistance. Miles per Hour. 30		to	40	Average. Pounds.
32 x 4 Goodyear Cord....	60	1,120	11.7	11.7	13.8	....	12.4
32 x 4 Fabric	55	1,145	24.1	25.0	23.5	24.4	24.25
35 x 5 Goodyear Cord....	60	2,100	33.0	33.6	34.2	33.8	33.65

These cars differed considerably in rolling resistance, but in every case the speed of the car had little or no effect on the result. Rear wheel tests were made confirming the results obtained with the front wheels, hence the conclusion from these tests that the internal rolling resistance of an automobile is practically constant at all speeds up to 40 miles per hour.

DISTRIBUTION OF POWER LOSSES.

The internal power losses of the six-cylinder Chalmers chassis have been determined in this way. The tires are 32 by 4, load on front wheels, 1,145 pounds, load on rear 1,545 pounds, tire inflation 75.

POWER LOSSES IN 6-CYLINDER CHASSIS (2,700 POUNDS).

	Pounds.	Per Cent.
Front tires only	18.2	31.2
Rear tires only	17.7	30.3
Front bearings	4.7	8.
Rear bearings and transmission.....	17.9	30.5
Totals	58.5	100.

Dividing the above four items into groups we find that the tires cause 61 per cent of the total resistance, while the axle bearings and transmission up to neutral consume only 39 per cent. The conclusion is that the tires are responsible for nearly two-thirds of the power lost in the car itself.

The above values are averages for speeds from 20 to 40 miles per hour, and, as before stated, the resistance changed little with the speed.

TIRE RESISTANCE AND PRODUCTION OF HEAT.

The discovery that 61 per cent of the internal power loss of this car is expended in the tires leads naturally to what becomes of this power.

It is probable that friction of the material within the tire structure is continually taking place, due to flexure at the contact with the road. This absorption of work and production of heat is similar to the friction brake, except that the friction is produced by bending the fabric, not by sliding it.

Assuming the truth of these assumptions, it ought to be possible to calculate from the work absorbed the amount of heat generated; also the temperature of the tire surface when it reaches thermal equilibrium. The solution of this problem is worked out like a hot water radiator; or, rather, as the wheel is revolving, like a hot blast heater.

These tires have 5.83 square feet of surface, and the force of resistance at the circumference is 8.85 pounds. At a speed of 30 miles per hour there will be generated 1,810 British thermal units per hour, and to dissipate this heat to the air will require a rise of temperature of 39 degrees F. above room temperature, based on a heat transfer coefficient of 8 British thermal units per degree per hour.

This calculation was made in advance of any experiments, but was later verified by running one of the 32 by 4 tires for half an hour at 30 miles per hour, after which the car was stopped and the surface temperature taken with a mercurial thermometer. The room temperature was 70 degrees F., and the tire temperature was 107.5 degrees, or a rise of 37.5 degrees as compared with the calculated rise of 39 degrees F.

This experiment confirms the theory that tire resistance is caused by flexure of the material, and leads logically to the conclusion that resistance will be increased by under inflation and by overloading.

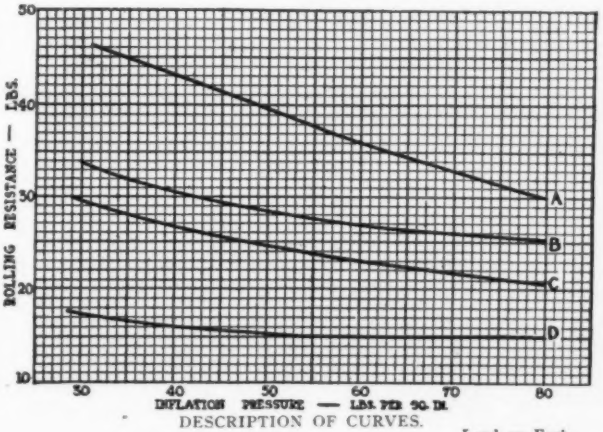
INFLATION PRESSURE AND LOAD.

Of the factors affecting rolling resistance, inflation pressure is perhaps the most important. Very considerable changes of resistance may be caused by moderate changes of pressure.

The load carried by the tire is also an important factor, which must be considered along with the inflation. It seems probable that for a given load there is a region of inflation below which the resistance increases very fast.

This relationship can best be shown by a series of characteristic curves, where rolling resistance is plotted against inflation

DIAGRAM SHOWING RELATION BETWEEN ROLLING RESISTANCE AND INFLATION PRESSURE.



DESCRIPTION OF CURVES.

	Wheels.	Tires.	Load on Each Wheel in Pounds.
A.	Rear	Fabric	772
B.	Rear	Fabric	550
C.	Front	Fabric	570
D.	Front	Silvertown Cord	570

for a number of loads. A diagram showing an incomplete series of such characteristic curves for 32 by 4 tires, is shown herewith.

The influence of inflation pressure is clearly shown in curve *A*, which represents the rolling resistance of the rear wheels under normal load with fabric tires. With reduction of inflation pressure from 80 to 30 pounds the rolling resistance increases from 30 to 45 pounds.

When the load on the wheel was reduced, the rolling resistance decreased from 30 to 25 pounds under high inflation pressure. Reduction of pressure caused an increase of resistance in this case, but not quite as pronounced as in the first curve. Curve *B* shows the rear wheel resistance under light load.

Curve *C* shows the resistance of the front wheels under load equal to that on the rear, and displays the same characteristics as curve *B*. The uniformly greater resistance of curve *B* is due to the transmission system connected with the rear wheels.

An approximate calculation of the increase of power caused by under inflation can be made from the above experiments. From the diagram the total rolling resistance at 80 pounds pressure, front and rear wheels combined, is 51.9 pounds, while the corresponding value at 30 pounds inflation is 72.5 pounds. Adding to these values the wind resistance calculated for 25 miles per hour (30 pounds), the total car resistance for the two cases is found to be 81.9 and 102.5 pounds. The conclusion is that an increase of power amounting to 25 per cent may be caused by very much under-inflated tires.

CORD VERSUS FABRIC TIRES.

Only a limited number of tests of cord tires have been made under conditions permitting accurate comparison with fabric tires.

One such comparison is shown on the diagram, curve *D*, where a cord tire, 32 by 4, was tested under exactly the same conditions on the front wheels for the whole range of pressures.

The characteristics of this cord tire are, greatly reduced resistance loss and ability to run at low inflation without much increase of resistance.

While these experiments point to the value of cord tires for reducing tire losses, more numerous and exhaustive tests are required covering a wider scope.

S. A. E. HAS A NEW MEANING.

On April 19 the Society of Automobile Engineers became the Society of Automotive Engineers, as a result of the amalgamation of the membership of the American Society of Aeronautic Engineers, the Society of Tractor Engineers and engineers of company members of the National Association of Engine and Boat Manufacturers. "Automotive" is, in a sense, a new word made necessary to describe comprehensively the various forms of self-propelled mechanical apparatus, such as aircraft, watercraft, passenger and freight motor cars and tractors of various types. This word, which is sound etymologically, has been understood and accepted by the public with surprising rapidity in view of its novelty. Both the words "automotive" and "engineer" are very emblematical of modern progress and of the most advanced types of transportation in peace or war.

A Washington office of the society will be opened in the Munsey Building in connection with the Council of National Defense as soon as arrangements can be made. This action was brought about by the closer co-operation of the society with the various Government departments, which work is increasing every day.

The society has been active in classifying its membership as to capability for Government service industrially or with the troops. Over two thousand of the members have filled out blanks indicating their experience in designing and producing engines and other parts for airplanes, motor trucks, watercraft of various types, tractors and munitions. Three or more grades of men have been classified according to the following callings: Chief engineers, assistant engineers, draftsmen, electrical engineers, superintendents, metallurgists, inspectors, apparatus testers, laboratory engineers, truckmasters, purchasing agents, service men, tool designers, executives, chemists and fuel and lubricant engineers. Trained in the highest speed industry the world has ever known, to get results without precedent as to equipment, material or time available and to assume large responsibilities, the members of the S. A. E. are well qualified to solve any automotive problems on which the Government may desire assistance. They are quite ready and willing to do anything that will assist the United States, serving in any capacity in which their country may see fit to use them at any time.

Because of war conditions, the summer meeting of the society, scheduled to be held the last week in June at Ottawa Beach, Lake Michigan, has been called off by the Council of the society, it having been found that each day finds the engineers more and more engrossed in war activities, and correspondingly fewer of the members with spare time for such a meeting. Instead of four days at Ottawa Beach it has been decided to hold a one-day meeting in Washington, D. C., on June 25. Washington was selected because many Government departments are closely associated with the work of the society.

The United States War Department, as a result of collaboration with the Society of Automotive Engineers, has revised its specifications for military motors, on a more practical basis, and less severe in several unimportant details. For the 1½-ton trucks the specifications call for 36 by 4 inch demountable tires.

TIRE PRICES ADVANCED.

The expected advance in tire prices has arrived. For the second time since January 1, the manufacturers have felt the necessity of marking up their price schedules, on account of the extra cost of materials and labor. In January, tire prices were increased, about 10 per cent on casings and 5 per cent on tubes. The difficulty of securing raw cotton of proper quality and consequent high cost of tire fabrics, is given as the principal cause of present increase. Crude rubber prices have been high, but not enough to greatly increase manufacturing cost.

The various companies have acted independently in this advance, but in nearly every case the increase is around, or exactly 10 per cent, and this rate applies to both tubes and casings and to all kinds, including Ford sizes, pneumatic, motorcycle and solid or truck tires. The variations from this 10 per cent include Firestone tires, some of which have advanced 12½ per cent, and Goodrich Q. D. and Silvertown tires, 15 per cent. Mechanical goods have also advanced 10 per cent.

AMERICAN TIRES IN BRAZIL.

American tire manufacturers lead in the exports to São Paulo, according to the commerce reports. Before the war, France supplied most of the tires used in this market, while United States exports were less than 5 per cent. In 1915 Italy led, but had to cede her place to America in 1916.

The imports of pneumatic tires for the three years preceding 1916 and the first nine months of 1916 were:

Country of origin.	1913.	1914.	1915.	Jan. 1 to Sept. 30, 1916.
Belgium	.....	$62,157	.....	.....
France	$188,330	167,363	$38,957	$46,156
Germany	34,649	23,330	.....	.....
Great Britain	777	21,510	2,702	111
Italy	46,188	8,559	186,899	166,007
United States	11,240	9,015	165,536	221,257
All others	376	2,416	.....	.....
Totals	$281,560	$294,350	$394,094	$433,531

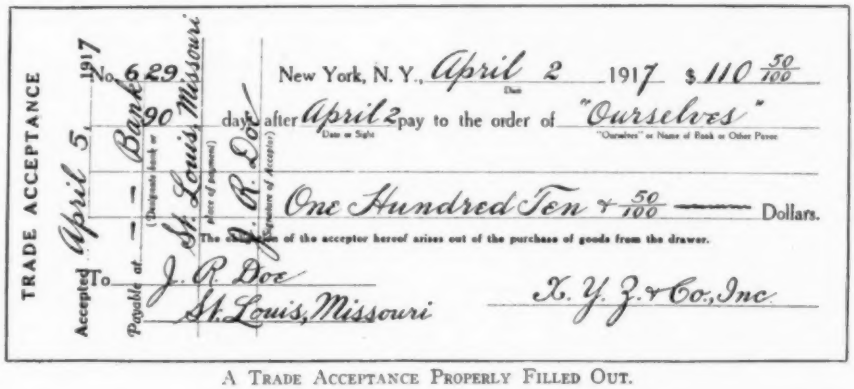
It is understood that by a recent agreement between the representatives of certain American manufacturers and European factory agents, tire prices in São Paulo, as in Rio de Janeiro, will be maintained on a fixed non-competitive basis. There is a small local production of solid tires, but as the work is done chiefly by hand the industry cannot yet compete with the imported article.

Trade Acceptances for the Rubber Goods Dealer.

By R. R. Voorhees.

TRADE acceptances are being used more and more by business houses on account of their value to both the buyer and the seller of goods. And the future will see an increasing use of these handy instruments of business. Only the larger concerns now use trade acceptances, but as their value becomes more generally known the smaller concerns will adopt them until finally they will be as familiar in the business world as are checks to-day. And for this reason it would be well for every rubber goods dealer to know just what they are, how they operate and the advantages they offer.

But before their operation is explained, it might be well to quote the definition of a trade acceptance as given by the Federal Reserve Board in one of its recent circulars, as follows: "A bill of exchange .... drawn to order, having a definite maturity and payable in dollars in the United States, the obligation to pay which has been accepted by an acknowledgment, written or stamped, and signed across the face of the instrument by the company, firm, corporation or person upon whom it is drawn; such agreement to be to the effect that the acceptor will pay at maturity, according to its tenor, such draft or bill without qualifying conditions." And it might also be well to state that trade acceptances were created by the Federal Reserve Act.


TRADE ACCEPTANCE
No. 629
New York, N. Y., April 2 1917 $110 50/100
April 5, 1917
90 days after April 2 pay to the order of "Ourselves"
Bank
St. Louis, Missouri
J. R. Doe
One Hundred Ten + 50/100 Dollars.
The consideration of the acceptor hereof arises out of the purchase of goods from the drawer.
Accepted
To J. R. Doe
St. Louis, Missouri
Payable at
X. Y. Z. & Co., Inc.

A TRADE ACCEPTANCE PROPERLY FILLED OUT.

The operation of trade acceptances is very simple. When a purchaser buys goods on time; that is, does not pay cash for the merchandise, the seller of the goods includes with the invoice a blank acceptance form, upon which has been written the number and amount of the invoice and also the date of maturity. In other words, if the purchaser buys on 30, 60 or 90 days' credit, the date of maturity will be 30, 60 or 90 days, as the case may be. If the buyer of the goods wishes to give an acceptance covering his purchase he fills in the date, signs it and designates the bank through which the amount is to be paid at maturity. This is then sent back to the seller of the goods, and if the seller so desires, he can sign this acceptance and take it to his bank, discount it and in that way obtain the money at once for goods that have been sold on time. The discount rate is smaller than it is on one name paper, since this is two name paper, both the buyer and the seller having signed it.

Of course, the advantages to the seller of the goods are most apparent. But there are real reasons why the buyer of goods should do credit buying on a trade acceptance basis instead of on the old style open account system that is now in general use.

At present, cash customers are given all the advantages in business. When they make a purchase and pay cash for it, they receive what is termed a cash discount and in the course of a year this amounts to considerable. But with the credit customer it is different. He pays the full amount of the bill because the seller of the goods is forced to wait 30, 60 or 90 days for his money and on that account cannot afford to give any discount. But as trade acceptances come into more general use there will be a marked tendency to allow a small discount to buyers of goods who give trade acceptances for their purchases. The sellers of the goods will be able to realize on the sale at once, minus a small discount, and on this account can afford to give a discount if the buyer will give a trade acceptance.

In addition to the possibility of obtaining a discount there will be a tendency to lower the net prices of the goods purchased. As the seller of goods gets more of his customers to give trade acceptances, covering their purchases he will be able to lower the net price of the goods he sells and in that way the buyer will be given an advantage that he did not have before the use of trade acceptances was possible.

Overstocking is one of the chief reasons for failure. Quite unintentional, to be sure, but still a fact, the average dealer is too apt to take on stock with the hope that he will be able to sell it instead of being confident that he can dispose of it. He has it in his place for a while and then, perhaps, finds that it does not sell. Much of this sort of buying soon puts him out of business. But if he gave a trade acceptance for everything that he bought on credit he would use more judgment in making purchases.

Giving a trade acceptance would not curtail the amount of goods that a seller would allow a purchaser to buy because by so doing the purchaser would indicate himself to be a man of business judgment who fully realized his obligations. The seller would feel that any purchases made under the new method of doing credit business were purchases of merchandise that the buyer really needed and on this account would be willing to allow the buyer to have it.

In case the buyer of the goods could not meet the trade acceptance when it was due, the seller would, in most cases, be lenient with him, since when the purchase was made, the buyer gave to the seller what he so much desired.

Some buyers feel that a trade acceptance is a note, but such is not the case. Trade acceptances can be given only for obligations arising out of the purchase of merchandise, and for old accounts or for money loaned. On the face of the acceptance is written the number and amount of the invoice, which proves that it is for merchandise that has been bought. Instead of a trade acceptance harming the giver, it really helps him by placing him in a preferred credit class and making him appear as one who wants to do business on the highest business plane.

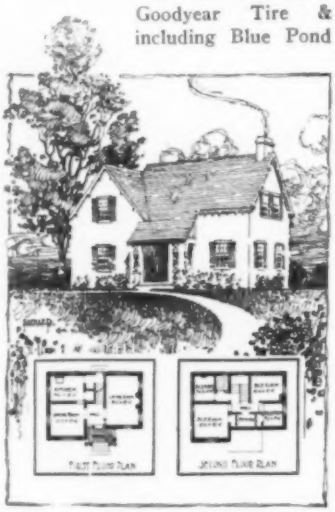
Trade acceptances are new and many do not realize their advantages. Every rubber goods dealer will do well to ask his bank about them and to ascertain if the firms of which he buys goods use them in their business. Trade acceptances are the coming method on which credit business will be done in this country, and it is only a matter of a short time when they will be in almost as common use as checks are to-day.

Financing an Industrial Village.

By John Barnard, Architect.

WHENEVER the better housing of employes comes up for discussion, the financing of such a project so as to enable them to purchase their homes on a partial payment plan is seen to be a problem of considerable importance. How this may be done on a cooperative basis is well illustrated by Goodyear Heights.

This development consists of 400 acres near the plant of the Goodyear Tire & Rubber Co., Akron, Ohio, including Blue Pond and a 28-acre park and athletic field affording land and water recreation facilities both summer and winter. The tract is being handsomely laid out with streets, sidewalks, small parks and playgrounds, trees and shrubs, and will eventually provide pleasant modern homes for 10,000 persons. On the 100 acres now developed 300 houses have already been built and arrangements have been made for the erection of 500 more this year. Like those previously constructed, about half of this number will be built by



A PICTURESQUE SINGLE HOUSE.

contract for the company and sold to employes, and the remainder at the request of employes according to their own plans, subject to the approval of an architectural board, general architectural harmony being desirable and certain restrictions necessary to the common good of the community. Both plans have their advantages, but the former is obviously cheaper because of distinct advantages in quantity buying and distribution of materials. The architects, Mann & McNeille, have developed English cottage types of harmony and individuality, yet varying considerably in size, arrangement and constructive materials, the idea being to provide homes within the range of every purse. Every street, however, is restricted as to minimum cost of all houses upon it.

The original cost of the land to the company and the various items of development are shown by the accompanying table:

Cost of property	$30,000.00
Excavating 100,000 yards	27,175.00
Curb for brick pavement, 11,796 feet	3,538.00
Gravel roads, 36,078 square yards	16,235.00
Sanitary sewer system	21,000.00
Storm water system	8,000.00
Main drain	8,510.74
Bridge (concrete)	9,729.66
Planting trees and shrubs	2,500.00
Office and engineering expense, architects, etc	21,000.00
Blue Pond drain	2,932.00
Instruments	445.00
Sidewalks, 265,531 feet	23,153.00
Grading about houses, top soil and seeding	13,000.00
Miscellaneous (ditches, surveyors' monuments, etc.)	1,882.60
Curbs and gutters for gravel roads, 35,958 feet	21,574.00
Total cost	$210,675.00
Total number of lots averaging 50 x 110—125 feet	430

Thus the total cost of each lot is nearly $500, but prices have been set at $240 to $760, according to desirability of location. The idea is to sell the property to employes at cost in so far as that can be estimated, and the actual payments are according to the accompanying tabulation.

Two mortgages are placed upon the property. The first, for about one-half the value, is carried by a large life insurance company, while the second, covering the balance of the purchase price, is carried by the Goodyear company. The semi-monthly payments specified are sufficient to pay off the second mortgage in 12 years and the first mortgage in 3 years more, the rate of interest being fixed at 6 per cent. Larger payments may be made or the full cash price paid if desired to save the interest. A semi-monthly assessment is made to provide for taxes as they come due, but for its own protection the company carries all fire and tornado insurance until the full purchase price has been paid. In addition, arrangements have been made for groups of 100 employes who so desire to take out life insurance on a diminishing scale which will assure the home to dependent families in the event of the employe's death. This increases the semi-monthly mortgage payments very little, the amounts ranging from 30 cents at the age of 21 for each $1,000 to 95 cents at the age of 55.

Cost	$1,984.00	$2,682.00	$2,288.00	$2,699.00	$2,801.00	$2,808.00	$2,845.00	$2,896.00	$2,998.00
Real Estate Value	2,480.00	3,352.50	2,860.00	3,373.75	3,501.25	3,510.00	3,556.25	3,620.00	3,747.50
Semi-Monthly Payments:									
First 5 years	11.27	15.25	13.01	15.34	15.92	15.97	16.16	16.54	17.06
Next 7 years	7.31	9.86	8.45	9.88	10.24	10.26	10.47	10.67	11.03
Last 3 years	3.86	5.19	4.44	5.22	5.43	5.43	5.53	5.22	5.75
15 years									

To prevent speculation, the payments for the first five years are based not upon the cost, but upon the real estate value, which is 25 per cent higher. At the end of five years, however, if the worker is still with the company and has kept up his payments, the difference between the two values, together with the interest thereon, is canceled and credited to him, his payments thereafter being on the basis of the cost price.

TWO-FAMILY SEMI-DETACHED AND SINGLE HOUSE TYPES AT GOODYEAR HEIGHTS.

[This is the third of a series of articles devoted to the better housing of employes.—Editor.]

What the Rubber Chemists Are Doing.

COEFFICIENT OF VULCANIZATION AND THE STATE OF CURE.

DR. Henry P. Stevens discusses in "The India Rubber Journal" (February 10, 1917) the paper of Dr. O. de Vries on the above topic, THE INDIA RUBBER WORLD (March 1, 1917). Doctor Stevens remarks that if physical tests on vulcanized rubber are to be of practical value in order that a decision may be made regarding the manufacturing value of any particular specimen, these tests must be carried out either on a rubber cured suitably to manufacturing conditions, or if cured beyond this stage (over-cured) there must be available some method by which the tests on the over-cured rubber may be correlated to tests on correctly cured rubber. No such method of calculation is at present available, as the necessary relationship has not been worked out between stress-strain curves and coefficient of vulcanization. A correctly cured rubber is one fully cured from the manufacturer's standpoint, not beyond that point at which aging is satisfactory. Otherwise the specimen is over-cured.

Rubber is a colloid, and shows the phenomena of hysteresis. Its physical properties at any moment depend partly on its previous history. It is therefore obvious that no conclusions should be drawn from any stress-strain curve without taking into consideration the previous history of the specimen. Dr. Stevens agrees with the statement of Dr. de Vries that "the percentage of combined sulphur is quite independent of the state of cure *as expressed* by the position of the stress-strain curve," but adds that the "state of cure" cannot be adequately expressed under present conditions by the stress-strain curve. It may, however, be possible when the "standard curve" or other methods are correlated to manufacturing conditions and the tests carried out on rigidly standardized lines.

Vulcanization is essentially a chemical process; so also is the subsequent decomposition of rubber which has been over-cured, and hence the proportional relationship of rubber and sulphur in combination is the best guide for a stable product, the first essential in the manufacture of rubber goods.

Messrs. Schidrowitz and Goldsborough have evidently correlated their stress-strain curve method to manufacturing conditions, as shown by their remarks on the subject in "The India Rubber Journal" (March 3, 1917).

Discussing the case in which the "coefficient" (according to Stevens) may be wrong, but the mechanical properties correct, Schidrowitz and Goldsborough note that the question at issue is whether state of cure or correct cure is to be judged by the chemical or the mechanical properties of the vulcanized article—by sulphur combined with the rubber or by the stress-strain curve. Their answer is that *ultimately* the attributes or quality of vulcanized rubber must be judged by the physical or mechanical properties.

Certain low-curing rubbers require, in order to acquire the necessary mechanical properties, a protracted cure, and in the course of such cure will combine with more than three per cent of sulphur, and in general slow curing rubbers deteriorate more rapidly than rapid curing goods, and will not age well because of the excess of combined sulphur, and possibly also by reason of the long heating necessary.

The physical and mechanical effects which vulcanization has upon rubber are shown in the clearest manner by the stress-strain curve method, and there is no other known method whereby the mechanical aspect of vulcanization can be systematically and accurately followed and measured.

Schidrowitz and Goldsborough remark in conclusion:

In view of the apparent lack of comprehension concerning stress-strain curves, we take this opportunity of briefly re-stating some of the more important points.

1. The "type" of the curve is *independent of the state of cure.* It therefore connotes inherent properties.
2. As the "type" varies for different rubbers, its determination affords a valuable method of comparison in regard to important mechanical properties.
3. We obtain a graphic representation of the progress of vulcanization.
4. We are able to cure to a definite mechanical condition, and to estimate the rate of cure necessary to attain that condition.
5. Having settled the position of the curve for a given rubber mixing we are able to control the vulcanization of the factory product.

Much else may be done with and deducted from the stress-strain curve method. In more propitious times the authors propose to recur to the subject at length.

While agreeing that stress-strain curves are of great value, intelligently applied, Dr. Stevens holds that the coefficient of vulcanization is the safest guide as to the state of cure.

VULCANIZATION BY AGENTS OTHER THAN SULPHUR.

Reviewing the recently published work of Ostromyslenski, Dr. H. P. Stevens presents some of his results in the "Journal of the Society of Chemical Industry" (February 15, 1917).

VULCANIZATION WITH NITROBENZENE.

Ostromyslenski's results (published in THE INDIA RUBBER WORLD, November 1, 1916) have not been duplicated and his claim cannot at present be accepted.

The effect of vulcanization has been obtained with mixes of rubber with di- or trinitrobenzene in the presence of bases such as litharge or magnesia without the least difficulty. Trinitrobenzene is far more efficient than dinitrobenzene. Mononitrobenzene, so far, has not given satisfactory results. Figures are given obtained with 100 parts pale sheet rubber, eight parts litharge and varying proportions of *m*-dinitrobenzene and sym-trinitrobenzene. The specimens were cured in a steam vulcanizer at 135 degrees C. for times varying from 5 to 120 minutes.

The results of the physical tests show that the products so far obtained possess relatively poor physical qualities. The best results were obtained with the larger proportion (four parts) of trinitrobenzene, but even in this case the strength as measured by the tensile product is not much more than half that obtained with a properly vulcanized rubber and sulphur compound.

The color of rubber vulcanized with nitrobenzenes is brown to black. Viewed by transmitted light in a thin stretched sheet it is yellow-brown and translucent or almost transparent. Litharge can be replaced by magnesia and probably by other basic oxides with similar results.

VULCANIZATION WITH BENZOYL PEROXIDE.

The discovery of peroxides as vulcanizing agents to replace sulphur was announced by Ostromyslenski. Of the peroxides employed, most of the experiments were made with benzoyl peroxide.

As is well known, benzoyl peroxide, like other peroxides, is very explosive, and consequently cannot be handled in the dry state. For these experiments it was used in the form of a paste with about its own weight of water. In this connection it presents no difficulty when added to the rubber on the mixing rolls, and the small amount of water added is lost by the time the mixing is complete.

In the first series of experiments three mixes were made of the same plantation crêpe rubber with the following percentages of benzoyl peroxide (reckoned dry): *A*, 0.33 per cent; *B*, 1.33 per cent; *C*, 6.67 per cent.

Mixings *A* and *B* gave very weak rubbers. Nevertheless the influence of even 0.33 per cent of benzoyl peroxide is clearly marked. Mix *C* gave the best results, the vulcanized

samples having approximately one-third the strength of a similar rubber vulcanized with sulphur in the same heat. Samples from mix *B* occupy an intermediate position. All the vulcanized samples are very pale in color, quite as pale as the original raw rubber. Those of mix *C* have a very attractive appearance. They are quite transparent and resemble some of the palest cold-cured sheet prepared from plantation crêpe.

In benzene the vulcanized mix *A* dissolves in a few hours in similar manner to raw crêpe. Mix *B* swells enormously, but does not dissolve. It remains a soft gelatinous lump in the solvent. Mix *C* behaves the same as an ordinary vulcanized rubber, swelling considerably, but retaining its original form. It may therefore be said that the change brought about by heating with benzoyl peroxide is exactly similar to that produced by sulphur and that the products formed have similar properties. The proportion of benzoyl peroxide required to give a fairly complete vulcanizing effect is similar to the proportion of sulphur which would be required for the same purpose, but the vulcanization with benzoyl peroxide is brought about in a much shorter time. Thus, in the above experiments and also in those published by Ostromyslenski, vulcanization is fairly complete in 10 or 15 minutes at 130 to 135 degrees C. with 4 to 6 per cent of benzoyl peroxide, whereas vulcanization would hardly have begun with a mix containing 5 to 6 per cent of sulphur and would require two to three hours for completion. Attempts to obtain satisfactory vulcanization with smaller proportions of benzoyl peroxide, but vulcanizing for longer periods, have not been successful. Thus, with 1.33 per cent of benzoyl peroxide better results were obtained when vulcanizing for 30 minutes than for 60 minutes. Further experiments are in progress.

ORGANIC VULCANIZING ACCELERATORS.

In a communication in the "Journal of the Society of Chemical Industry" (February 15, 1917), Dr. Spence says, regarding organic vulcanization accelerators, that, according to Ditmar, Gottlob and King, the discovery of the principle of vulcanization, whether of natural or of synthetic rubber, by means of organic catalysts dates from the disclosures of the Elberfeld Farbenfabrik in November, 1912. This is probably true so far as Europe is concerned, but not so with regard to America. Dr. Spence states that substantial proof of this assertion is to be had from an analysis of his own previously published work on the subject of vulcanization.

In the "Kolloid Zeitschrift" (volume 10, page 303-305, 1912), more than six months before the Eberfeld Farbenfabrik made application for their first patent on this subject, Dr. Spence described certain experiments, the significance of which passed apparently unobserved. The reference follows: "More than a year ago we prepared samples of two carefully chosen mixings. Both mixings were made from partially purified rubber with about 9 per cent of sulphur. In order to make the investigation as comprehensive and complete as possible, the two mixings were purposely chosen so that two quite distinct types of compound as different as possible in their properties were obtained. The first was a slow-curing compound deteriorating rapidly; *the second, on the other hand, was a quick-curing mixing which we knew from experience would resist deterioration indefinitely . . . . Two compounds of the same general character as No. 2 were prepared; both these compounds contained about 9 per cent of sulphur and were free from mineral compounds.*"

Dr. Spence then states:

As a matter of fact, the first of these two compounds actually contained 1 per cent of piperidine, the very substance referred to in the German patent of November 16, 1912. The formula for the mixing was as follows: Plantation Para, 100 parts; sulphur, 10 parts; piperidine, 1 part. Without the use of piperidine in this mixing the results given in the communication referred to would have been utterly impossible.

In regard to the discovery of vulcanization of synthetic rubber by means of organic accelerators, also credited to Elberfeld Farbenfabrik, the vulcanization of these products by this means was actually carried out and successfully accomplished by me both for isoprene-caoutchouc and for the dimethyl caoutchouc from pinacone at a time when the large industrial concerns in Germany engaged in the study of the synthesis of india rubber were in the dark as to their lack of success in the vulcanization of their products. The proof of this assertion and the complete vindication of my position with reference to the subject in general I am content to leave over until a later date. At that time I will also bring evidence to show that even the reagents claimed by Peachey (English patent 4,263 of 1914) were known to me and had been used by me both scientifically and industrially several years before his application was applied for.

VULCANIZATION.

The following remarks on the chemistry of vulcanization are condensed from a study of the subject by André Dubosc ("Le Caoutchouc & la Gutta-Percha," January, 1917). In discussing the work of Stevens, the author amplifies his views on vulcanization, published two years ago.

The early inventors and rubber workers practiced vulcanization purely as an art, and were interested solely in the industrial results. Parkes seems to have seen a little more clearly than others the problem of vulcanization as a science. The first notable advance in the study of vulcanization was the theory of Dr. Carl Otto Weber, who held that sulphur in saturating the double bonds either of one molecule, in the case of ebonite, or of a more or less extended polymer, in the case of different qualities of soft rubber, determined and stabilized the physical properties of the crude rubber complex. Although of the greatest interest, Weber's theory was incomplete, because it did not take into account the state of polymerization of sulphur used in vulcanization, nor did it explain the function of litharge and magnesia in this connection.

Subsequently, Oswald put forward this theory that vulcanization is an absorption and not a chemical phenomenon. His views have found many adherents, somewhat displacing the well-founded chemical theory of Weber, although the latter gains confirmation by the latest work of Bysow, and of Stevens on the influence of nitrogenous products and resinous substances in vulcanization, indicating that the proteins contained in rubber are very important factors in considering the properties that rubber acquires when vulcanized. The work also of Baritt supports the new ideas of beneficial influence exercised on rubber by the proteins, hitherto erroneously considered as impurities. In fact, the proteins are now known to play the part of a catalyst in the process of vulcanization.

The effect of the addition of foreign nitrogenous substances to rubber has been studied, with positive results.

The function of rubber resins in vulcanization is important, the most striking result being the deterioration of the rubber after vulcanization, when all the resinous elements have first been eliminated. This fact is explained as follows:

It has only been possible to get the colloidal sulphur necessary for vulcanization, in the absence of resins, by a partial decomposition of the rubber which has been altered and depolymerized.

The formation of water accompanying the production of colloidal sulphur explains the need for an absorbent, like whiting, in mixtures, to prevent porous rubber.

It has been demonstrated experimentally that when rubber resins and the proteins, previously separated from the rubber, are heated at temperatures approaching those of vulcanization (120 to 150 degrees C.), it is possible completely to convert the sulphur added into sulphydric acid.

When a mixture of litharge, magnesia, oxide of zinc and sulphur is heated either in air or under oxidizing influence, metallic sulphur and sulphurous acid are constantly produced. When the latter is made to react on sulphydric acid resulting from the preceding reaction, colloidal sulphur and water are formed.

Without establishing the theory just explained, Stevens summarizes the following results of his experiments:

1. Chemically pure rubber vulcanizes badly.
2. The presence in rubber of foreign albuminoids, like caseine, facilitates vulcanization.
3. Vulcanization was facilitated by the presence of non-nitrogenous hydrocarbons, like starch.

In explanation of the phenomena discussed by Stevens, Dubosc says, that the proteins and resins acting on the sulphur generate sulphydric acid, while the oxidized rubber generates sulphurous acid. These acids react on each other and produce colloidal sulphur, which alone is susceptible of combination with rubber.

In proportion to the quantity of insolubles, proteins and oxidized rubber, a larger or smaller quantity of polymerized sulphur is converted into colloidal sulphur. The rest of the polymerized sulphur remains as free sulphur.

The whole secret of the action of the impurities of rubber and of materials like litharge consists in the transformation resulting in colloidal sulphur.

METHOD OF ANALYSIS.

DETERMINATION OF COPPER BY ACETYLENE.

METHOD by C. B. Clark, Somerset Rubber Reclaiming Works. The salt to be analyzed is dissolved in water with the addition of ammonium hydrate, and heated a short time on a water bath. Precipitation of copper acetylide is effected completely, even in the cold, by the addition to the solution of acetylene in excess. The precipitate is collected, washed and decomposed by digestion in hot dilute nitric acid. The carbonaceous residue is removed by filtration. The filtrate is evaporated to dryness, ignited and the ash weighed as copper oxide (Cu O).

This method is particularly useful for separation of zinc from copper, as the salts of zinc are not decomposed by acetylene.

CHEMICAL PATENTS.

UNITED STATES.

PLASTIC RUBBER COMPOSITION. A substitute for sealing wax comprising resin, caoutchouc, sulphur, white lead and petroleum spirit as a solvent for the resin and caoutchouc. [Ramon Castells, Barcelona, Spain. United States patent No. 1,219,536.]

SOLID TIRE. A solid elastic tire made of a composition of rubber, 34 parts; lithopone, 50 parts; sulphur, 6 parts; litharge, 2 parts; and iron oxide, 2 parts. [Arthur Nixon, Rusholme, Manchester, England. United States patent No. 1,221,083.]

THE DOMINION OF CANADA.

RUBBER SUBSTITUTE. Fish oil, sulphur, five to one, and a metallic oxide, combined by heating from 175 to 220 degrees C., and subsequent heating of mass under relatively high pressure at 155 degrees C. [Morton Gregory, Tacoma, Washington. Canadian patent No. 173,601.

FILLER COMPOSITION FOR TIRES. A composition comprising crude rubber, 34 parts; infusorial earth, 14 parts; rosin oil, 1 part; flour of sulphur, 4 parts; air slaked lime, one-quarter part; carbonate of ammonia, 2 parts, and baking soda, 1 part. [Edward L. Sherbondy, assignor to The Aero-Cushion Tire Co.—both of San Jose, California. Canadian patent No. 173,866.]

CALIFORNIA MAGNESITE.

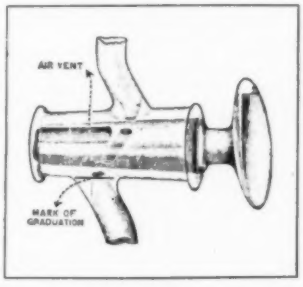
Magnesite is being mined near Rutherford, California. In quality it compares with the Austrian magnesite. The calcined product contains over 86 per cent of magnesia, not over 3 per cent of lime and from 4 to 7 per cent of iron and alumina. After the war calcined magnesia from this California source will probably appear in the market as a compounding ingredient.

Secretary Olsen, of the American Institute of Chemical Engineers, is sending out a notice that the ninth semi-annual meeting of that body will be held in Buffalo, New York, June 20-22.

LABORATORY APPARATUS.

AUTOMATIC PIPETTE.

THE Lowy automatic pipette presents several advantages. There is no necessity of adjusting, maintaining or manipulating the volume of liquid. This is controlled by the automatic stop cock.



The exact measured volume of liquid is automatically delivered.

Inaccuracies due to parallax and personal equation are eliminated.

There is no possibility of fingers bringing contamination to the mouth.

The pipette is exceedingly easy to manipulate. The liquid is drawn up until it just passes the graduation mark. The stopper is turned 90 degrees. The exact measured volume of liquid is thus shut off from the excess drawn into the pipette. By again turning the stopper 90 degrees, air pressure expels the correctly measured volume of liquid out of the pipette. [Palo Co., 90 Maiden Lane, New York City.]

CHEMICALS FROM JAPAN.

According to information from the British Commercial Attache at Yokohama, the Japanese Minister for the Interior has issued an order permitting the exportation of certain chemicals from Japan. Among these are sulphur, wax, ammonium carbonate, oil of turpentine and castor oil.

CHINESE VINEGAR AS A COAGULANT.

Chinese vinegar has been suggested as a coagulant, but Professor B. J. Eaton, of the Department of Agriculture, Federated Malay States, gives it as his opinion that there is no especial advantage, as far as results are concerned, in using it in place of acetic acid. This vinegar, he states, is probably prepared by acetic fermentation from rice. It differs from English and other vinegars only in being colorless. He finds that the cost, based on the acetic acid content, is far greater than ruling prices of glacial acetic acid.

A NEW METHOD OF COAGULATING RUBBER.

An interesting discovery was recently made at the Lowmont factory in the Kalatura district of Ceylon. Ordinary rubber is prepared there with the aid of acetic acid only, or with acid and sodium bisulphate. On the Lowmont plantation 5 ounces of sodium bisulphate are put into every 25 gallons of latex and water, more or less equally mixed. The liquid is allowed to settle for 12 hours when 20 per cent of dark coagulated lumps is formed. The remaining purified latex is then strained and 5 ounces of acetic acid added to every 25 gallons, when coagulation promptly takes place. It is said that the rubber treated in this manner has, so far, almost always brought top market prices, while the dark rubber made of the lumps has brought only a few cents less than the other, if properly made.

ACETONE FROM THE MAHWA-TREE.

Although acetone is chiefly employed in the manufacture of munitions, yet its use as a solvent in the rubber industry makes it interesting to learn that a new source of this chemical has been found. In the past, acetone was extracted chiefly from wood, maize and starch, but two English scientists in Hyderabad, India, have discovered that the flowers of the mahwa tree contain a larger quantity of acetone than is present in any other vegetable substance—ten times more than in wood. The Director-General of Ordnance in India reports it to be the best source of acetone yet found.

New Machines and Appliances.

RUBBER SOLUTION MACHINE AND ASBESTOS COMPOSITION MIXER

THE adaptation of the principle of the "Universal" type of mixing machines to the construction of rubber solution and asbestos composition machines has proved to be very successful. By specially designed blades the materials to be mixed are thoroughly kneaded and kept in constant motion in the trough, resulting in a homogeneous product within a comparatively short time.

The solution mixer shown in the illustration is built in two different types, one with gears on one side that is used for medium and soft grades of rubber, and the other with gears on both sides of the trough and adapted for hard grades of rubber. The trough is made of sheet iron and the machine is provided with a hinged wrought iron cover to prevent the escape of solvent and with corners or internal lips that the material may be discharged into an ordinary sized vessel.

If desired the machine may be provided with an arrangement to drive it at a slow speed or a high speed. The slow

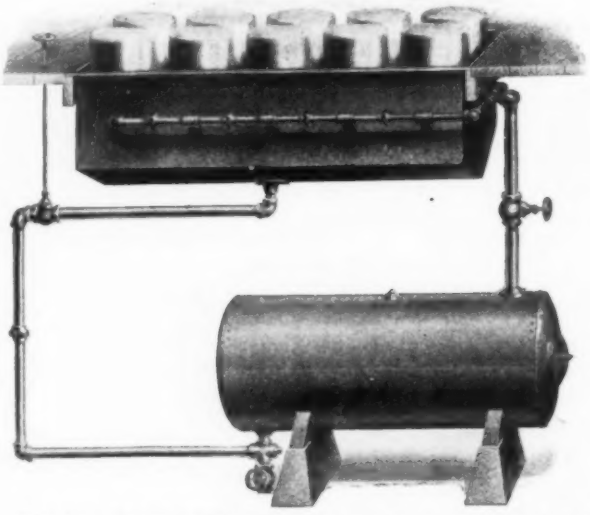
speed is generally used at the beginning of the operation when the material is of a stiffer consistency, and the fast speed for the end of the operation, when the material is more of a syrup-like consistency. Furthermore, the trough may be jacketed for heating or cooling purposes.

For compositions containing asbestos that are used in making Klingerit type packings a special machine is constructed. The trough of this type is made of cast iron, has a toothed saddle and the blades are protected with serrated shoes. This arrangement is of great advantage as it separates the fiber of the asbestos without breaking it. [Werner & Pfleiderer Co., Saginaw, Michigan.]

AUTOMATIC CAUSTIC SODA DISSOLVER.

In THE INDIA RUBBER WORLD of January 1, 1917, it was suggested that a process used in the textile industry could be used to advantage in rubber reclaiming plants. The pertinence of the suggestion is here shown in the illustration of an apparatus that has been designed for the use of rubber reclaimers.

The operation is entirely automatic and extremely simple. The iron drums are stripped from the cakes of caustic soda, which are placed on the grid in the hopper. The tank and dissolver is then filled with clear cold water so that the cakes are submerged to a depth of about 6 inches. Solution of the caustic starts at once and is maintained by a patented system of circulation which continues without attention until the cakes are completely dissolved.



Solutions of any required strength may be made without the use of steam or compressed air and there are no moving parts requiring power for their operation. No attention is necessary other than the initial charging of the apparatus which will automatically effect complete solution of the caustic in about five hours. The dissolver can also be charged at night with the assurance that the solution will be ready for use in the morning. For hot solutions a thermo syphon attachment is provided. [The Walter E. Lummus Co., Boston, Massachusetts.]

MACHINE FOR CUTTING BEADS, BELTING AND PACKING.

The development of new machinery of special design continues to mark the steady progress being made as the rubber industry expands.

The accompanying illustration is that of a recently developed machine which may be used for cutting belting and other heavy

fabrics, and it is particularly adapted to cutting off the beads of worn-out tires.

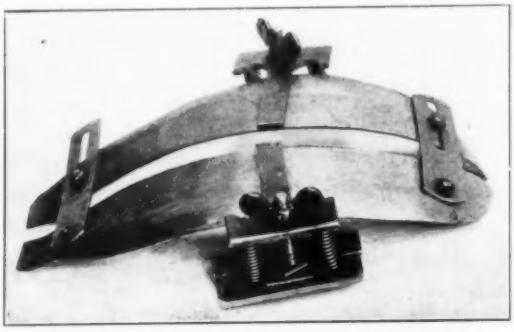
The construction is extremely simple, and its operation may be clearly understood by referring to the illustration and the following brief description:

In removing the beads from clincher tires, the casing is placed upon the horizontal guides and the vertical rollers are adjusted to the inner circumference of the tire. When the treadle is depressed the revolving cutter penetrates the wall of the casing and the pressure of the collars on the cutter arbor revolves the tire and the bead is quickly removed. The tire is then reversed and the other bead cut off in the same manner. [Reichel & Drews, Chicago, Illinois.]

THE MOMENT ADJUSTABLE COMPOSITION SOLE CRAMP.

The shortage of sole leather has greatly developed the sale of composition soles that are now being manufactured both here and abroad in large quantities. The device here shown for attaching soles to boots and shoes is a timely suggestion from England, where it is used with success.

A layer of special cement with strong adhesive properties is first applied around the edges of the sole about one inch wide and allowed to dry. It is then heated, placed on the shoe and



hammered down tightly on the last. The welt grips being opened widely, the cramp is placed on the shoe and the grips fitted over the welt or middle sole. The thumb screws are then tightened and the welt pressed down against the sole with nippers or the handle of a wedge-shaped knife, making a close joint all around, and the shoe is left in the cramp for ten minutes or until the heel is benched.

The device is adjustable to the right or left shoe by moving the sole plates up or down and better results are obtained by using a last in applying soles with this appliance. [The Revolite Co., Limited, Manchester, England.]

A NEW ALLOY FOR RUBBER MOLDS.

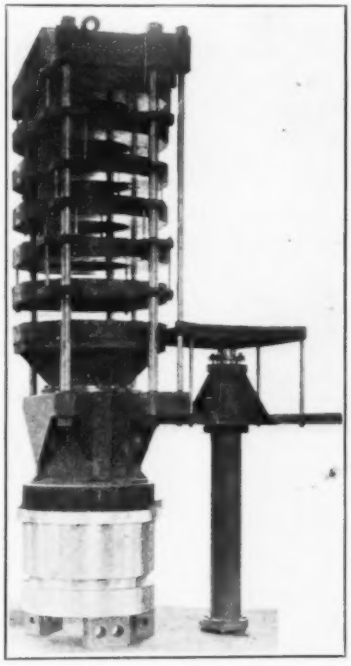
Rubber molds cast from ABCilium metal alloy are said to be so smooth that their surfaces do not require machining, polishing only being necessary, and in some cases even this may be dispensed with.

They are, moreover, impervious to all acids used in the manufacture of rubber goods and unaffected by excessive heat or soapstone blasting.

The thermal conductivity of this metal is even greater than that of copper, consequently an instant heating or cooling is possible. A mold made of this alloy is 70 per cent lighter than an iron mold made off the same pattern, and may be constructed lighter than iron molds now in vogue. It is claimed that cast iron tire molds weighing 1,000 pounds will weigh less than 200 pounds when made of this alloy, all factors of safety being considered. The specific gravity of ABCilium is 2.51, which is lighter than 99 per cent pure aluminum. [The A. B. C. Castings Co., Cleveland, Ohio.]

SEVEN-PLATEN BEAD PRESS.

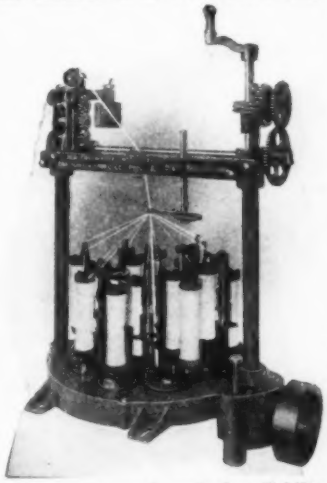
A seven-platen bead press with large capacity and novel construction and one that has been designed to meet the requirements of modern tire production is shown in the illustration. This is a multiple opening bead press with seven round steam platens. Attached to the press is a hydraulic elevator, the platform of which is guided on two additional columns, which are part of the press.



Attached to the elevator table is a platform supported by rods. This platform is for the operator, who rises with the elevator and removes the molds from the various openings. This arrangement saves considerable floor space, as all the molds are loaded on the elevator instead of being deposited on long operating tables, as is usually done. [Southwark Foundry & Machine Co., Philadelphia, Pennsylvania.

THE NEW ERA BRAIDER.

The following description of a new braider should be of particular interest to manufacturers of elastic tapes and braids, as this machine is so constructed that it is almost impossible for oil to get on the rubber or finished braids.



Among the advantages claimed by the manufacturers are fewer and simpler parts, increased speed, ease of operating, accessibility, safety to operator, freedom from shadows and cleanliness of work.

Perhaps the most notable change is the self-lubricating feature, the entire mechanism running in oil. It is necessary, therefore, to oil only once in several months, which makes a considerable difference in production, besides saving time. All gears are covered, reducing liability of accident and giving a better rating by liability insurance companies. The studs are cast integral with the base, and are constructed so that they allow a positive fastening of the plates or "quoits."

All gears used in the machine are cut, and the construction is such that the carriers bear directly upon the surface, and are revolved by smooth cam action in place of being knocked around. This new action allows increased speed, with less strain and breakage of the yarn.

The carrier itself is designed to accommodate all sizes and types of bobbins, and unless otherwise ordered the machines are

equipped with carriers to take a 5-inch, 2-ounce bobbin, which reduces the changes of bobbins necessary and consequent stoppage of the machine.

It will be noted in the illustration that two small uprights take the place of the usual three uprights, which reduces the shadows cast and improves the light on the work. The starting shaft is enclosed in one of the uprights, and the finished braid passes through the other, thereby protecting it from spots and stains. The former, cross-bar and take-up are all of new design. The former consists of but one piece, giving all adjustments from one point. The cross-bar is thin, and is carried in a vertical position, throwing the least possible shadow. The take-up rolls are so situated that they provide for a longer space after the braid leaves the former in which the operator can trim up the work, pull out loose ends and attend to imperfections. Take-up gears are quickly changed by the removal of a split pin, the change taking less time than is required to describe it.

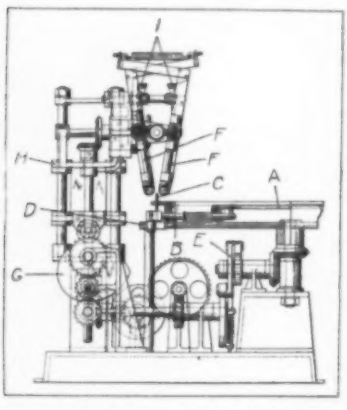
A feature of the new braider is the capacity of each machine to make three numbers of braid; for instance, a 16-spindle machine will make a 16-round braid, a 13-flat braid and a 17-flat braid. This is due to the design of the carrier race and gear layout, and the change over from one number to another is made very simply by merely changing two gears and inserting the filler bar.

This braider is particularly well adapted to make elastic braids, as its freedom from superfluous oil protects the rubber. An extra fitting is supplied to regular machines for the purpose of guiding the rubber from the tension rolls. [The Era Manufacturing Co., Providence, Rhode Island.]

MACHINERY PATENTS.

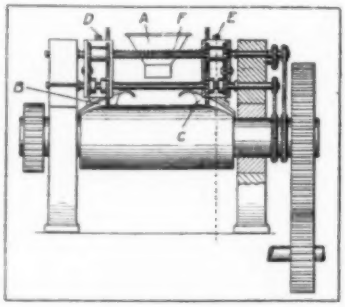
MACHINE FOR REMOVING DIPPED GOODS FROM FORMS.

THE removal of toy balloons, nipples and finger cots from the dipping forms is accomplished automatically by this machine. A side elevation, partly in section, is shown in the drawing, in which *A* is one-half of the circular table carrying the radial spring rods *B* that support a plurality of vertical form holders *C* on their outer ends. The forms are locked against upward movement when the revolution of the table brings them in operative position by a cam plate *D*. An intermittent, or step by step, motion is given to the table by bevel gearing and a ratchet wheel operated by the bell-crank lever *E*. Thus each form is successively brought in position to be operated upon by the stripping arms *F F*. The reciprocating motion of these arms, necessary in removing the articles from the forms, is obtained by cam *G*, that raises and lowers the carriage *H*, to which the arms are attached. The arms are opened and closed by spring-controlled cams *I*, and when the machine is in operation the forms are stripped by the revolving concave composition rollers, located at the ends of the reciprocating arms. [William A. Brubacker, assignor to the Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,220,177.]



AUTOMATIC MIXING MILL.

The manual labor of cutting and rolling back the rubber jacket that forms around the front roll of mixing and warming mills is mechanically performed by this machine. The drawings represent a front elevation, partly in section, of a two-roll mixer equipped with the automatic cutting and feeding device. This comprises a feed hopper *A*, an endless apron feed not shown, and two cutting and turning blades *B, C* that are operated vertically by screws *D, E* and laterally by lead screw *F*, driven by chain gearing from the front roll. The intermittent action of the blades is controlled by electrically-driven clutches mounted on the vertical and horizontal screws. A rotating disk controller not shown, is provided with contact pins that make and break the electric circuit for actuating the clutches. By arrangement of the contact pins in the disk perforations the blades are operated at proper intervals, when the rubber sleeve is cut and fed back to the rolls automatically. [Robert M. Graham, Akron, Ohio. United States patent No. 1,220,221.]



OTHER MACHINERY PATENTS.

THE UNITED STATES.

1,220,288. Fabric and hose making machine. L. A. Subers, East Cleveland, Ohio.

1,221,089. Paper carrier for wrapping machines. F. M. Pierce, assignor to Pierce Wrapping Machine Co.—both of Chicago, Ill.

1,221,349. Collapsible core. R. M. Merriman, Akron, Ohio.

1,222,259. Device for repairing pneumatic tires. G. W. Boynton, Boston, Mass.

THE DOMINION OF CANADA.

173,781. Tire cementing machine. J. N. Hibner, Detroit, Michigan, U. S. A.

173,871. Mold for hollow rubber articles. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of E. L. Stimson, Cleveland, Ohio, U. S. A.

174,089. Tire clasp. G. H. Broughton, Toronto, Ontario.

174,209. Footwear vulcanizer. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of C. J. Randall, Naugatuck, Connecticut, U. S. A.

THE UNITED KINGDOM.

16,328 (1915). Tire core. R. Bridge, Castleton Ironworks, Castleton, Lancashire.

16,330 (1915). Vulcanizer head. R. Bridge, Castleton Ironworks, Castleton, Lancashire.

16,400 (1915). Rubber mill. S. C. Davidson, Sirocco Engineering Works, Belfast.

16,549 (1915). Repair vulcanizer. A. B. Low, 108 South Broadway, and I. C. Osborn, 833 Meade street—both in Denver, Colorado.

16,890 (1915). A mandrel for use in joining the ends of air tubes and other rubber tubes. F. H. Hall, 6 Livery street, Birmingham.

17,072 (1915). Hand operated rubber grater. J. Burns, 26 Waveley Road, Coventry.

17,181 (1915). Tire vulcanizing mold. J. H. Coffey and J. H. Coffey, 73 Jameson avenue, Toronto, Ontario, Canada.

103,422. Device for preserving pressure in tennis balls. F. W. Stockton, 5450 Ridgewood Court, Chicago, Illinois, U. S. A.

PROCESS PATENTS.

RECLAIMING RUBBER FROM LEATHER TREADS.

BY this process the rubber that serves to attach leather non-skid tire treads to the casing is recovered. The metal studded leather bands are removed from the casing and a certain number of these are suspended in a steam jacketed digester, into which a mixture of 3 parts of tetrachloruret of ethane and 1 part of benzine is poured. The digester is closed and heated by introducing steam into the jacket for some minutes. Tetrachloruret of ethane has the property of dissolving a considerable quantity of sulphur when warm. The liquid containing the dissolved sulphur is drawn off into a suitable apparatus, where it is recovered for further use.

The same quantity of solvent is poured into the digester and

heated for half an hour at a temperature not exceeding 120 degrees C. By the action of the solvent the rubber is separated from the leather and sinks to the bottom of the digester in the form of a pasty mass on which a jet of steam is directed, causing evaporation of the solvent. This evaporated liquid is condensed and collected to serve anew. The mass of rubber is removed through the manhole in the lower part of the digester, washed and rolled into sheets. [L. B. Becker. French patent No. 481,851.]

WASHING AND SHEETING DIFFERENT QUALITIES OF CRUDE RUBBER. Plantation rubber and fine Para or wild rubber are mixed together, passed through the washing machine in the usual way and sheeted, water being allowed to flow over the rubber during its passage between the rolls. [Erwin E. A. G. Meyer, assignor to Morgan & Wright—both of Detroit, Michigan. United States patent No. 1,218,949.]

OTHER PROCESS PATENTS.

THE UNITED STATES.

1,219,833. Method of building cord tires. R. M. Merriman, Akron, Ohio.

THE DOMINION OF CANADA.

174,208. Method of making footwear. Improvement in the art of manufacturing rubber shoes. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of W. E. Piper, Melrose, Massachusetts, U. S. A.

THE UNITED KINGDOM.

16,226 (1915). Preparation of rubber for vulcanization. W. J. Mellersh-Jackson, 28 Southampton Buildings, London. [Boston Rubber Shoe Co., Malden, Massachusetts.]

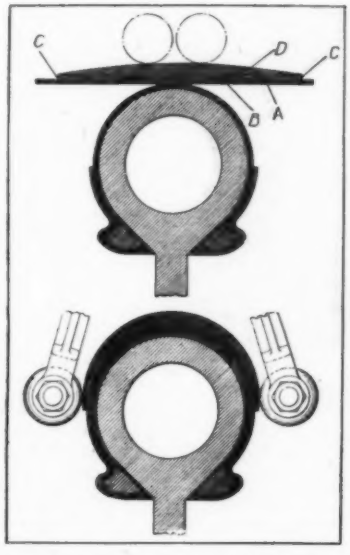
COLOMBIA.

1,279. Process for waterproofing cloths and skins for rubber ponchos, coats, leggings, shoes, etc. Ramon A. Vélez, Urrao, Antioquia, Republic of Colombia, South America.

MISCELLANEOUS PATENTS.

APPLYING TREAD COVERS TO TIRE CARCASSES.

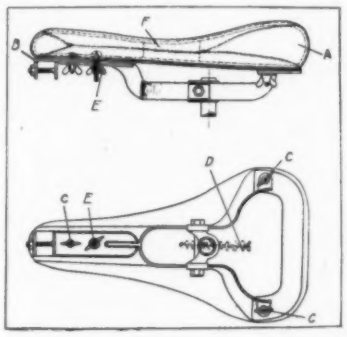
IN this invention the outer layers forming the tread and side portions of the tire casing are assembled one upon the other, forming a slab that is applied to the casing by a special rolling device.



The carcass is built up with successive fabric plies and the beads applied in the usual manner with the exception, however, of the tread and fabric strips forming the outer covering. These parts are mounted one upon the other as they come from the calender, in the following order. First comes the cushion strip *A*, that covers the tread portion and extends part way down the sides of the carcass; then the breaker strip *B* and the filler strips *C* that abut against the edges of the breaker strip, and finally the tread strip *D*. A pair of rolling devices, comprising two spherical bodies mounted in ball bearings at the ends of two co-acting arms, exert a circumferential as well as radial action in rolling the slab on the carcass. [Ferdinand F. Brucker, assignor to The Miller Rubber Co.—both of Akron, Ohio. United States patent No. 1,220,178.]

FRENCH PNEUMATIC CUSHION SADDLE FOR BICYCLES AND MOTORCYCLES.

The saddle is composed of a leather-covered cushion, in which is enclosed one or more rubber air chambers of suitable form and provided with air valves. The envelope *A* is attached to the metal support *B* by screws *C*. A stout leather plate, strengthened with a sheet of ebonite, fiber or other stiff material, is inserted between the envelope and the metal support, to prevent their contact.



The air chambers are introduced into the envelope through a slit *D* and inflated through valve *E*.

When only one air chamber is used, the concave form shown in the illustration may be obtained by a compartment *F*, or by small stays placed between the upper and lower walls of the air chamber. [Mariani and Radaelli. French patent No. 481,673 (May 6, 1916.)]

NARROW ELASTIC WEBBING. The essential feature of this invention consists in sewing one or more rows of longitudinal stitches through the web, after it has been woven with uniform tension on the loom. [Archibald Turner, Leicester, England. United States patent No. 1,221,489.]

MOTOR AND ACCESSORY MANUFACTURERS.

At a meeting of the executive committee, board of directors and credit committee of the Motor and Accessory Manufacturers last month, a committee consisting of C. W. Stiger, Christian Girl and W. O. Rutherford was appointed to mobilize the resources, both materials and men, of the association for the purpose of cooperating with the National Government in its needs, mainly in supplying component parts of motor cars and trucks, airplanes, motor boats and tractors.

The idea of grouping the members according to the products they manufacture, having received an approving vote from 95 per cent of all the members, a committee was appointed to present a plan for such purpose, consisting of C. W. Stiger, W. O. Rutherford and L. M. Bradley.

A midseason meeting, an innovation for this association, will be held at Atlantic City, September 12, 13 and 14. Committees were appointed to perfect plans for this meeting.

PROVIDING FOR WAR DEPENDENTS.

The desirability of some uniform method of providing for the dependent families of men enlisting in the military and naval forces has resulted in considerable agitation of the matter. Some firms are paying full wages in addition to the army compensation, others are paying the difference between the army wage and that previously received by the employe, while many desire to do the proper thing but have not decided what that really is.

Secretary of War Baker has asked the Chamber of Commerce of the United States to ascertain the sentiment of the business men of the country regarding voluntary assistance, and a special committee has been appointed to take care of the matter, of which F. A. Seiberling, president of the Goodyear Tire & Rubber Co., is chairman.

The National Fire Protection Association will hold its annual meeting in Washington, May 8, 9 and 10. A large attendance is expected. Over 100 new associate members were added in March, and the list was largely added to last month.

New Goods and Specialties.

BATHING CAP NOVELTIES.

THE season for the beach parade is drawing near and this year's coterie of feminine bathers bids fair to outrival last summer's in piquancy of headgear. As beautiful colors may now be obtained in rubber as in any other material, and its pliancy and velvety texture are highly attractive. A few of the novelties of this season in bathing caps which are likely to be popular are here shown. In the top illustration the body of the cap is gathered at the sides and caught by two rosettes, a band and streamers of a contrasting color in rubber hanging loose except when the wearer goes in the water, when the streamers may be securely tied about

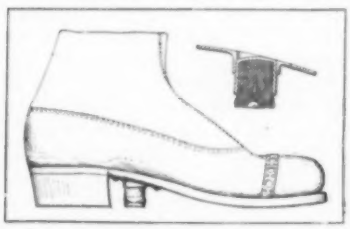
the head, thus adequately protecting the hair. A jockey cap of mottled rubber with a striped visor is a saucily appealing innovation, and the lower illustration displays a square-cornered cap with a tight-fitting band and trimmings of striped rubber in contrasting shades. [United States Rubber Co., 1790 Broadway, New York City.]

ROLLER SKATE WITH RUBBER CUSHIONS.

A sidewalk roller skate, claimed to possess all the advantages of the higher priced rink skate, has two large rubber bumpers or cushions which give great resiliency, relieve the jar from the wearer when roller-skating on hard pavements or sidewalks, and materially assist in permitting a free turning axle. This skate has self-contained ball bearing wheels, two sets of bearings to each wheel, and is strongly constructed yet lighter in weight than the average roller skate. It is adjustable and will fit shoes from 8½ to 11 inches in length. [Conron-McNeal Co., Kokomo, Indiana.]

RUBBER CUSHION HEEL AS AN ARCH SUPPORT.

This arch-supporter, in the form of an extra heel, is claimed to combine the advantages of those that are built in the shoe and those that are detachable, since it cannot move about under the arch of the foot, yet can be adjusted to meet the individual requirements of the wearer. A solid cushion of rubber is permanently fastened in a steel sleeve, threaded at one end so that it may be screwed to the metal base-plate that is placed in front of the ordinary heel. A metal plate underneath the rubber cushion adds to its wearing qualities, and when the proper height of supporter is selected this resiliant supplemental heel should add considerably to the wearer's comfort in standing or walking. [Peter Broadbrooks, Batavia, New York.]



THE KANGAROO REVERSIBLE HEEL.

The novelty in this heel consists in the means and method of attaching the rubber part to the leather or composition leather lift that is nailed to the shoe in the ordinary manner. No cement is necessary, thus greatly reducing the time required for attaching the heel to the shoe. The heel comprises two parts that are dovetailed together. The leather or composition part that is nailed to the heel of the shoe is provided with a central opening and beveled edges. The rubber heel, or tread, is also molded with a projecting portion, the edges of which dovetail into those of the leather lift, holding both parts firmly together. After the leather portion is nailed to the shoe the rubber heel may be easily slipped in place by hand, no further fastening being required. When worn

out a new pair may be readily applied by the wearer. Should the heels wear unevenly they can be quickly exchanged. They are also non-slipping and have no nail holes to become clogged with dirt. [David William Jameson, Newark, New Jersey.]

SHAMPOO CHAIR AND BASIN WITH RUBBER PAD.

Having the hair shampooed is generally regarded by women as an uncomfortable necessity, the neck being held in a strained position long enough to cause considerable discomfort. Various methods of alleviating the inconvenience of this operation have been devised and a recently invented chair and basin arrangement appears to offer an agreeable solution of the difficulty. This new chair to be placed about six inches in front of the basin, has a hinged back which is lowered until the head rests comfortably on a rubber neck-piece forming part of the basin. With the head in position the hair can be washed thoroughly, soap lotion being applied through a small faucet and hose at the left. A gas heater in a water compartment makes it possible to obtain hot water instantly at any desired temperature. [The Excelsior Shampoo Outfit Co., Chicago, Illinois.]

RUBBER FABRIC WATER BAGS FOR THE ARMY.

During the recent Mexican campaign a new application of rubber in army equipment was developed which may prove advantageous again. It consisted in the use of rubber fabric bags

for carrying and purifying drinking water for the troops. These bags, which were designed by the quartermaster's department, are of double texture material, the outside of heavy khaki duck, similar to army cloth, and the lining of a thinner material. This is made up into cylindrical bags about the size of a barrel and of a capacity of about 50 gallons. There is a metal hoop at the top hinged to close like a traveling bag, and, at the bottom, four taps where the contents can be drawn off into canteens. These bags are filled with water from any available source, and by means of chemicals are purified and rendered fit for drinking within a few minutes, and this water is transported in these heavy bags with other stores of supplies needed by the army.

"CORALINE" ERASERS.

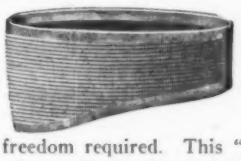
A new series of rubber erasers of an attractive coral hue, doubtless suggesting the above trade name, has recently been put upon the market. These erasers appeal especially to draftsmen, since their rhomboid shape makes erasure easy without disturbing the adjacent lines or letters. The texture is soft and velvety and they are claimed to possess excellent erasive qualities. They are supplied in two sizes, No. 310, small and No. 315, large. [Weldon Roberts Rubber Co., Newark, New Jersey.]

RUBBER HEEL WITH REPLACEABLE PLUGS.

A rubber heel employing an entirely new principle as well as a new design, is here shown. Replaceable plugs of white rubber are fitted at three points into the ordinary cushion heel, as seen in the illustration, and these plugs keep the heel absolutely level, doing away with the tendency of the usual rubber heel to wear down at the edges. The plugs also prevent slipping, and although they never pull out unless intentionally removed, their movement, in and out, as the wearer walks, gives added resilience. When worn down they are easily replaced, without the use of cement, by moistening the base with vaseline or any heavy lubricant and pressing straight down into the heel with any blunt instrument. [Emery Heel Sales Co., Boston, Massachusetts.]

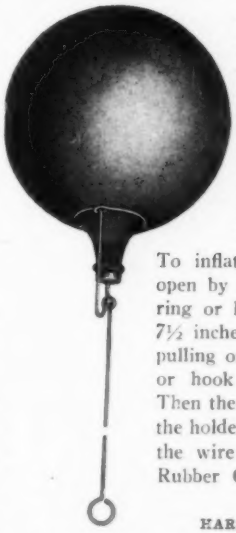
ELASTIC AUTO-BODY SUPPORTER.

Long rides in automobiles, while beneficial to the health in many ways, are apt to have an injurious effect if the body is not well supported, owing to the continuous jarring of the machine. Women's corsets afford such support, and for men a practical appliance is now on the market which adequately sustains the back and abdomen against this jarring motion, yet affords the absolute freedom required. This "Auto-Body Supporter" is in the form of a well-shaped elastic band of pink silk-finish thread interwoven with rubber thread. It is made 6 inches deep, in all sizes. [Sharp & Smith, Chicago, Illinois.]



TOY BALLOON WITH WIRE HOLDER AND HOOKED-DOWN VALVE.

An attractive novelty is shown in the "Perfection" toy balloon. It remains invariably upright, waving gracefully on the end of a wire holder, and is held in perfect alinement with the wire by being firmly hooked down to the valve. The advantage of this holder over the old reed and string variety is self-evident. Also, it is a simple matter to inflate or deflate the balloon by means of the valve. To inflate, ascertain that the valve is open by pushing in gently on the wire ring or hook; these balloons inflate to 7½ inches in diameter. After inflating, pulling outward gently on the wire ring or hook will tightly close the valve. Then the hook is put through the ring in the holder and hooked into the U bend in the wire under the ring. [The Globe Rubber Co., Cuyahoga Falls, Ohio.]



HARD RUBBER PENCIL HOLDER.

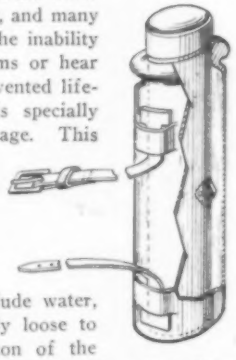
A pencil holder that is practical and convenient for short lengths of pencils is made entirely of hard rubber. The holder consists of a barrel four inches long for regular pocket size, or three inches long for vest pocket and shopping bag size. A tapered, reversible pencil clutch is fitted to one end of the holder and this holds securely either hexagon or round-shaped pencils of varying diameter. A removable eraser clutch inserted in the opposite end of the holder takes a standard size erasive tip which is easily renewable. These holders are supplied completely equipped with pencil and eraser and in various styles, with fancy mountings, if desired. [Vaughn-Upton Co., Inc., 249-251 Causeway street, Boston, Massachusetts.]

THE WEILAPHONE.

A telephone booth shuts out all disturbing sounds but cannot increase the power of the voice coming from the receiver. Both these desirable objects are accomplished, it is claimed, by a simple attachment called the "Weilaphone," shown in the accompanying illustration, in which the base, ear tips and Y-shaped holders are made of hard rubber composition, connected by soft rubber tubing. The contour of the ear pieces in relation to the face is formed and maintained by a copper wire proceeding from the Y piece upward, extending a short distance in the ear pieces. By means of this wire the instrument is held in place in the ears, rendering unnecessary the use of the hands to support it. When the instrument is in use, the telephone receiver is set on a soft rubber cap on the base piece that not only supports the receiver but serves to modify the harsh sounds sometimes incidental to the use of the telephone receiver and to shut out all outside noises and vibrations, thus bringing the voice at the other end of the wire clearly and distinctly to the user of the "Weilaphone." [The Weilaphone, Inc., New York City.]

LIFE PRESERVER FLASHLIGHT ATTACHMENT.

The difficulty of rescuing people from the water at night or in a fog is readily apparent, and many lives have been lost at sea owing to the inability of would-be rescuers to see the victims or hear their cries for assistance. A newly invented life-saving apparatus, shown herewith, is specially designed to overcome this disadvantage. This device consists of a rubber bag in which is contained an electric flashlight, the whole being attached by straps or other suitable fastening means to the ordinary form of life-preserver or life-belt. The rubber fits tightly around the lens, so as to exclude water, but the body of the bag is sufficiently loose to permit operation of the contact button of the flashlight. [A. M. McGiff, 337 West Twentieth street, New York City.]



NON-SKID RUBBER HEEL AND FIBER-SOLE.

A rubber heel embodying the same non-skid angle design as the well-known tire tread of its manufacturer has recently been placed upon the market. This heel is tough wearing and springy, and the angle tread, shown in the accompanying illustration, affords a firm foothold.

Coincident with the manufacture of this heel, the company began making a fiber sole which is claimed to be an exceptionally high-grade product that can be stitched, trimmed and finished the same as leather. The same material is also made in sheets of any desired thickness for soling. Both heels and soles are supplied in black, tan or white. [The Marathon Tire & Rubber Co., Cuyahoga Falls, Ohio.]

IMPROVED FIRE HOSE CABINET.

An interesting invention for fire equipment comprises a metal hose cabinet 18 inches high, 13 inches wide and 4 inches deep, inside measurements, so constructed that as soon as the hose is drawn out of the cabinet, water begins to flow through it. Fifty feet of ¾-inch fire hose, provided with a nozzle and so arranged that it takes up but 8 inches of the cabinet's entire width, is held in place by two steel coil springs which are covered with rubber, thus preventing all damage to the hose should it be replaced after use before it is thoroughly dry. One end of the hose is connected to an automatic, double-seated valve, locked when not in use, and seated against the pressure. When in use, this valve is seated with the pressure and the more pressure is applied the tighter it becomes.

This cabinet can be placed in any house or public building and is supplied by a water pipe connected with the house supply, affording the same facilities as a fire department. [John Egleston, Westfield, Massachusetts.]

The National Insulate Co., Inc., with offices at 1239 Broadway, New York City, is now equipped to manufacture articles made of composition materials, such as phonograph records, molded electrical parts, buttons and novelties.

EXPLOSION OF A HORIZONTAL VULCANIZER.

SEVERAL months ago a horizontal vulcanizer used for open steam curing in an English rubber mill exploded violently, blowing off the head, but, fortunately, no one was injured. The investigation that followed revealed the following facts which proved beyond all doubt that with ordinary care the accident would not have happened.

The vulcanizer was of the ordinary horizontal type, with a ⅜-inch iron shell, 4 feet 6 inches in diameter by 6 feet long. The back end iron plate was ⅝ inch in thickness, flanged and single riveted to the shell with rivets 2⅛ inches apart. The door was the full diameter of the pan and of ⅝-inch iron plate, dished about 6 inches. It was hinged to the shell and held in place by 21 hinged bolts, 1¼ inches in diameter, fitting into slots in the angle bar and door. Steam was supplied through a reducing valve set to 45 pounds, and the usual fittings were provided, including a relief valve set to 45 pounds.

VULCANIZER DOOR BLOWN OFF BY EXPLOSION.

The cause of the explosion was the forcing out of the 12 lower bolts from their slots, due to the door flange being angled or sprung, the door being then forced away from the remaining 9 bolts.

The explosion was of a violent nature, the door being blown bodily off, breaking the hinge at the pan, and tearing the door flange in way of the hinge, as shown in the illustration. The reaction lifted the pan bodily and forced it back, breaking the front standard, the pan finally being held up by two of the lower bolts resting on the top of the front standard. Practically all the contents of the pan were discharged and the pan itself suffered no damage except the broken hinge.

BRICTSON COMPANY TO BUILD IN OMAHA.

The Brictson Manufacturing Co., Brookings, South Dakota, has decided to locate in Omaha, Nebraska, although the date when building operations on its new plant will be begun has not yet been decided upon. This company manufactures a metal-studded tire with a 10,000 mile guarantee. The Omaha factory will be equipped for the manufacture of a complete line of rubber tires, in both plain tread and non-skid types, also inner tubes, and later on the company contemplates adding to its present line other rubber articles which can be manufactured to advantage. The directors are as follows: A. O. Brictson, president and general manager; George W. Cobel, H. F. Haroldson, G. J. Flittie and W. L. Montgomery.

The Editor's Book Table.

A GERMAN-ENGLISH DICTIONARY FOR CHEMISTS. BY AUSTIN M. Patterson, Ph.D. John Wiley & Sons, Inc., New York City. [5 by 7 inches, 332 pages, flexible binding. Price, $2, net.]

THE need of a book of this kind has been keenly felt by all scientific men, whether well versed in the German language or otherwise. Germany is headquarters for technical, scientific work, and German scientific publications contain a great amount of valuable matter, some of which is difficult to understand and which the average German-English dictionary translates very inadequately. Dr. Patterson was formerly editor of "Chemical Abstracts," as well as editor of chemical terms for Webster's New International Dictionary, and thus is peculiarly fitted for preparing a work of this kind. While special attention is given to this particular need, a fairly voluminous general vocabulary is also included, in which, however, occur many words having a technical as well as a popular meaning, and this meaning is given first, although in ordinary dictionaries it may be omitted or at least not given the prominence it deserves. The book is small enough to go in the pocket, is well bound in flexible covers, and cannot fail to be of everyday use to those who read the German scientific papers, and especially the chemical ones, to keep abreast of the times.

UNIFIED ACCOUNTING METHODS FOR INDUSTRIALS. BY Clinton E. Woods. The Ronald Press Co., New York City. [Large 8vo, 466 pages, half leather. Price $5, post-paid.]

Industrial accounting is as diversified as are industrial concerns. The need of a unified system is acknowledged by accountants themselves. Many institutions have adopted and adapted, have added to their systems item by item, until the result is complexity rather than simplicity and clarity. The author, who has been connected with prominent concerns, among them at least one large rubber company, has for 20 years been handling industrial problems of large and small industries, and this book, which is in the form of a detailed accounting system, is intended to fit into every element of an industrial or manufacturing business, of whatever size or nature. It is written for the executive, the engineer and the accountant, and presents a system which would seem exceedingly efficient. Supplementing the body of the work are nearly 100 forms for statements, cards, charts, labor accounts, analysis, sheets, inventory, etc.

THE DANISH WEST INDIES, THEIR RESOURCES AND COMMERcial Importance. By H. G. Brock, Philip S. Smith and W. A. Tucker. Department of Commerce, Washington, D. C. [68 pages, illustrated. Price, 15 cents.]

Now that the Danish West Indies are no longer Danish, but are possessions of the United States, this description of them is one which will interest all classes of readers. The book gives a large amount of information condensed into a comparatively small space and treats of the geographical characteristics, government resources, business conditions, agricultural and allied industries. Several interesting illustrations, a map showing the position of these islands, and enlarged maps of the four principal ones are included.

In the chapter devoted to agriculture and allied industries no mention is made of the cultivation of rubber, but it is interesting to note that cotton is second only to sugar as a product of these islands. In 1913 some 2,000 acres were devoted to Sea Island cotton, but owing to the appearance of insect pests in the fields, and to the various difficulties experienced as a result of the European war, financial loss was threatened, and since that year cotton raising has been temporarily abandoned. Several varieties of cotton were considered by the agricultural experiment station, including "Sterling S," "Cameron 106," "Sakellarides" and "Southern Cross," and from these, many crosses and hybrids have been evolved with the object of securing a variety which will resist the ravages of insects and which will produce a good quantity and quality of lint. It is claimed that the yield from a 4½-acre plat where careful records were kept was 5,299 pounds of seed cotton yielding 25 per cent lint, worth in Manchester, England, 34 cents a pound. This shows that cotton is a profitable crop when cultivated in commercial acreages. It is estimated that there are about 5,000 acres on the south side of the island of St. Croix that might be profitably cultivated.

COMMERCIAL TRAVELERS IN LATIN AMERICA. BY L. DOMeratzky. Government Printing Office, Washington, D. C. [42 pages. Price, 10 cents.]

This pamphlet, which is No. 35 of the Tariff Series, published by the Bureau of Foreign and Domestic Commerce, Department of Commerce, is certainly a valuable compilation of facts which are absolutely necessary to be known by all business houses that contemplate extending their trade to Latin America by personal representatives. It gives the regulations in each country which apply to the commercial traveler—the documents he should take with him; the customs treatment of his samples; the duties on advertising matter and such miscellaneous information as passports, buying seasons, expenses, and the like. Each country is treated separately. All countries in Central and South America are included, as well as Cuba, Haiti and the Dominican Republic.

STANDARD METHODS OF CHEMICAL ANALYSIS. EDITED BY Wilfred W. Scott. D. Van Nostrand Co., New York City. [6 by 9 inches, 894 pages, illustrated, cloth. Price, postpaid, $6.]

This is a compilation of carefully selected methods of technical analysis that have proven of practical value to the professional chemist. Mr. Scott, who is research chemist of the General Chemical Co. and was formerly chief chemist of the Baldwin Locomotive Works, is the author of many chapters and has been assisted in the preparation of the book by a large number of eminent chemists, each somewhat of a specialist in his own particular line of analysis. Each chapter is devoted to one element, and is arranged according to the physical properties, detection, estimation, preparation and solution of the samples, separations and methods. The chapter on "Sulphur" contains 28 pages and 6 illustrations. Among articles of interest is one on the determination of antimony in rubber goods. The book is one which may well find a place in the library of the analytical chemist, where it is likely to be of frequent use.

PURCHASING, ITS ECONOMIC ASPECTS AND PROPER METHODS. By H. B. Twyford. D. Van Nostrand Co., New York City. [6 by 9 inches, 252 pages, 112 charts, diagrams and forms. Price, $3, net.]

Equal to if not greater than any other department of modern industry is that of the purchasing agent. All other branches of a mercantile or manufacturing plant may be efficient but if the goods and materials are not of the right kind and quality or not bought at right prices, that establishment cannot succeed. The author of this work has a wide experience in manufacturing, engineering and electrical railway industries, and the book shows most effectively the results of this experience. The work is divided into several sections, starting with purchasing in its widest phase, the art and ethics of buying being considered. The personnel of the purchasing department is explained, showing the organization and the duties of each of the workers in that department. Following this is a description of the operation of the purchasing department, the method of handling invoices, the operation of stores, all of these being fully described and forms shown for use in each division of the department. Diagrams through the book show the progress of an order from the time the requirement is reported to the purchasing agent, until the purchase is completed. These diagrams run from a simple

routine in the small business to the complex and more highly perfected systems of great industries. Many points brought out in each chapter are of sufficient value to render the book highly useful to the man who buys, whether he be in a large organization or simply running a small business.

CHEMICAL ENGINEERING CATALOG. THE CHEMICAL CATALOG Co., Inc., 1 Madison avenue, New York City. [9 by 12 inches, 288 pages, cloth.]

This book is in the nature of a compilation of catalogs of concerns which supply chemical engineering equipment, machinery, chemicals and supplies. It is intended to supersede a large mass of printed matter issued by individual manufacturers and is classified and indexed so that it furnishes in a small compass a large amount of information of value to chemical engineers, chemists and manufacturers in any way connected with chemical industries. The classified index is confined to 75 or 80 pages, the rest of the book being in the nature of condensed catalogs of a large number of concerns identified with the trade. This catalog is not sold but is loaned to those interested in the chemical and allied industries and is approved by a committee representing the American Institute of Chemical Engineers, the American Chemical Society and the New York Section of the Society of Chemical Industry.

ANNUAL REPORT OF THE INDUSTRIAL COMMISSION, 1915. NEW York State Department of Labor. [Octavo, cloth, 417 pages.]

Every large employer of labor in New York State will find much of interest in the annual report of the Industrial Commission published by the Department of Labor. Its ten parts are devoted to the general report of the Commission and the more detailed reports of the several bureaus, including that of Inspection, Workmen's Compensation, Mediation and Arbitration, Statistics and Information, Employment, Industries and Immigration, Industrial Code and Fire Hazards, Boilers and Explosives. Many opinions of the attorney-general construing the labor laws constitute the final part.

New York is among the 24 states which, like most European countries, maintain public employment offices. The records of this bureau for the year ending September 30, 1915, show 22,856 persons applied for by employers, 49,554 situations wanted, 26,641 persons referred, and 13,391 positions reported filled. There are 26 occupational groups under males and 8 under females. Factory workers, both male and female, include rubber and allied products workers, while male general laborers include rubber and allied products laborers.

O ACRE DE HOJE E DE AMANHA. A COMMUNICATION ADdressed to the "Sociedade Nacional de Agricultura" during the session of November 19, 1916, by J. Virgolino de Alencar. Published by "Jornal do Brasil," Rio de Janeiro, Brazil.

In this communication the author strongly urges the encouragement of earnest and scientific cultivation of the *Hevea* in Acre, and to this end requests the above society to aid by spreading the necessary information and by interesting the right kind of men to undertake such planting. He points out that superior qualities of the true *Hevea Brasiliensis*, found in Acre and vicinity, deteriorate more or less when it is transplanted to other localities. In connection with this species especially he calls attention to the unscrupulous methods of tapping by which these trees, in a very short time, are either killed or rendered unproductive. He pleads for such supervision and regulation as will suppress this evil and gives warning that such practices, due to greed or general ignorance, are factors which make it possible for the Orient to compete successfully with Brazil.

A report of the author's plantation in Rio Yaco by the agricultural authorities of Alto Purus, and an estimate of the gains to be derived from a plantation similar to that of Dr. Alencar are final arguments for planting rubber in this natural habitat of the *Hevea*.

NEW TRADE PUBLICATIONS.

THE tire repair man can get many valuable ideas and suggestions from the 1917 catalog of the Williams Foundry & Machine Co., Akron, Ohio, which has just been issued. It not only describes and pictures the full line of tire making and tire repairing machines, tools and appliances manufactured by this house, but also contains a great amount of information of practical value to those engaged in this line of business.

* * *

The B. F. Goodrich Co., Akron, Ohio, has issued an attractive 40-page pamphlet describing its rubber goods for the lumber industry, which is carefully compiled, handsomely printed and profusely illustrated. It is not a mere catalog, but to a certain extent a handbook of interesting information on this subject.

* * *

Health insurance is one of the proposed factors of modern efficiency. Facts in respect to compulsory health insurance, as presented at legislative hearings in New York and Massachusetts, are succinctly given in a pamphlet sent by Magnus W. Alexander, Lynn, Massachusetts.

* * *

Werner & Pfleiderer Co., Saginaw, Michigan, manufacturer of mixing and kneading machinery, is sending out one of the handsomest and best arranged catalogs of this class of goods which we have seen. The book contains 84 pages, each printed in two colors, the cover, in full colors and handsomely embossed, appropriately showing a brawny workman holding one of the peculiar shaped mixing blades from the company's machines. Each digester, dissolver, washer, kneader or mixer is shown in half-tone from carefully retouched photographs. Much information regarding dimensions, capacity and special adaptation is given, also guarantees and conditions under which these machines are sold, and other matter of interest to rubber cement and rubber goods manufacturers.

* * *

A neat desk or wall calendar has been received from the Xylos Rubber Co., Limited, reclaimer, Manchester, England. In an appropriate setting are cards for days, months and dates, prominent and distinct, while the background contains advertising information of the concern's specialties.

* * *

The United States Rubber Co., New York City, has adopted the name "Keds" for its lines of canvas shoes with rubber soles, and is sending out some excellent window display matter for advertising these goods. A cut-out of paper represents a young man and a young woman, each wearing these shoes, between and beyond them a view of a tennis court; these to be placed across the front of the window. The cut-outs are so gummed that by moistening they can be made to adhere to the window. There are attractive and odd-shaped window cards for display with shoes of this character and a diagram explains the proper arrangement of all these in the window. The advertising matter is in brilliant natural colors, and the whole display is likely to be of advertising value to the storekeepers who may utilize it.

* * *

"Mobilizing Money for War" is the title of a 12-page pamphlet being distributed by the Guaranty Trust Co. of New York, intended to show the reason for and the necessity of investing in the great government loan for national defense to which the public will soon be given an opportunity to subscribe. It points out that the United States is the richest country in the world to-day, its national assets equaling the combined wealth of Great Britain, Russia, France and Italy, and that the whole nation must enlist its wealth as well as its manhood to win the war.

Interesting Letters from Our Readers.

OUR GROWING RUBBER TRADE WITH THE DUTCH EAST INDIES.

To the Editor of The India Rubber World:

DEAR SIR—According to the present trend of the trade the Dutch East Indies promise to become a greater source of rubber for American manufacturers than ever before. The demand for smoked sheet from Java and Sumatra plantations, always good, has increased considerably of late because of obstacles placed in the way of American buyers in the British colonies. The increasing war export duty, which has no counterpart in the Dutch colonies, is perhaps the principal reason, although the permit, which must be procured of the Tire and Rubber Committee in London, is an important factor because it delays and renders shipments so uncertain. It is to be hoped that with the United States in arms shoulder to shoulder with England, the American rubber trade may be relieved of some, at least, of the many formalities which have attended all rubber imports during the war.

England cannot well afford to lose her largest rubber customer, which consumed about 80,000 tons of plantation rubber in 1916, for which an average price of 70 cents a pound or $1,568 a ton was paid. The year's total business, therefore, aggregated $125,440,000, and as the profits averaged 45 cents a pound, Malayan planters are $80,640,000 the richer thereby. The Dutch rubber production is increasing steadily, however, and the acreage and bearing figures of the Growers' Association of Batavia indicate that it will reach 120,000 tons annually in 1919, which is 5,000 tons more than the total consumption of the United States in 1916. A more considerate arrangement with America is the only thing that will prevent a still further transfer of trade to the Dutch colonies. This is shown conclusively by the fact that although prices have risen several cents above those in Malaya for similar grades, American buying still continues good.

Observer.

Boston, April 23, 1917.

A PACIFIC MERCHANT FLEET.

To the Editor of The India Rubber World:

DEAR SIR—Every American of spirit welcomes the plan to build 3,000 wooden cargo ships of 3,000 tons each, 1,000 of them to be in service within 18 months. It does the heart good to see activities about the old New England shipyards again, and to know that many others are to be opened elsewhere. By such means the "Stars and Stripes" will once more become a familiar flag in the principal ports of the world, and this is quite as it should be. These wooden makeshifts can later be replaced by steel ships and, as The India Rubber World has repeatedly asserted, the commerce of our great nation must never again be allowed to depend upon foreign bottoms.

A ship flying the American flag every three miles, and later every mile, between America and England or France is indeed a phophecy to stir the imagination, but are we not forgetting the Pacific in our efforts virtually to bridge the Atlantic? Our duty to provision, munition and otherwise supply neutrals and the nations engaged in our common cause is plain, but to do so entails the importation of great quantities of raw material, much of which comes or might come to our Pacific coast.

No thinking person doubts but that ruthless submarine warfare will presently be extended to our Atlantic coast, so that unavoidable ship losses in the export of manufactures will make it essential to conserve tonnage in imports to the very maximum. The increasing dependence of the United States upon the tropics for raw materials and foodstuffs not produced in this country is shown by the enormous imports of tropical products during the fiscal year 1916, amounting to $1,060,850,416, of which $304,000,000 was rubber. Much of this vast total comes from the East or foreign Pacific ports, and during the war can be brought to San Francisco or Seattle more safely than to Atlantic coast cities. Moreover, high cargo and insurance rates and the losses by submarine attack, certain to come, will render transcontinental freights relatively less formidable.

During 1916 about 80,000 tons of rubber, or 27 cargoes of 3,000 tons each, came from the East and had it become necessary might have been entered at Pacific coast ports. Our exports to Middle and Far East countries are constantly increasing, and Russian events promise to render Vladivostock one of our great foreign markets, so that there will be cargoes to go both ways. American consumers to-day are dependent upon British and Japanese ships to bring rubber from Singapore, Colombo and Penang, via Hong Kong, where it is transferred at a considerable loss of time and labor. Submarine losses have reduced the British service, and although a new service has been inaugurated by two Dutch ships between Batavia and America, the situation is not greatly relieved. Because of the lack of ships the cargo rate to America from Hong Kong had early this year been increased from $24 to $30 a ton.

Let a goodly number of our proposed fleet of wooden merchantmen be built in Pacific coast yards and put into service to the Far East, that the American flag may become as familiar there as in the days when ships from New England seaport towns were known the world around.

A Rubber Importer.

San Francisco, April 16, 1917.

JUDICIAL DECISIONS.

CONSOLIDATED RUBBER TIRE CO. vs. The B. F. Goodrich Co.; Consolidated Rubber Tire Co. vs. Republic Rubber Co. These were suits in equity on exceptions to the report of the master, brought before the District Court, N. D. Illinois, E. D. It was held that the master's recommendation of five cents a pound as a reasonable royalty should be approved; furthermore, according to precedent, the law read that a licensee of part of the patent rights in a certain territory, or even in the whole country, cannot sue in his own name. The decision was that the reports of the master in each case should be approved, and all objections and exceptions thereto overruled. [Federal Reporter, Vol. 237, page 893.]

UNITED STATES CUSTOMS DECISIONS.

The United States Court of Customs Appeals, March 26, 1917, rendered the following decision relating to raincoats in the case of True Fit Waterproof Co. v. United States. Goods made by cementing with rubber a cotton cloth to a cotton and wool cloth, and goods made by cementing with rubber a cotton and silk cloth to a cotton and wool cloth, the rubber in each case being negligible in value, are composed in chief value of cotton, wool, or silk, according to which represents the greatest value as yarn, plus its proportion, on the basis of quantity, of the cost of weaving and other expenses incurred in making the cloth and bringing it to the condition it had immediately prior to its combination with the other materials in order to form the goods in question. For this purpose that cloth which is composed in chief value of one of these fibers should not be regarded as made entirely of it. Raincoats made from such goods are dutiable under paragraphs 256, 266, or 291, given below, according to the material of chief

value as found by this rule, and not as wearing apparel not specially provided for (par. 261).

Paragraph 256. Clothing, ready-made, and articles of wearing apparel of every description, composed of cotton or other vegetable fiber, or of which cotton or other vegetable fiber is the component material of chief value, or of cotton or other vegetable fiber and india rubber, made up or manufactured, wholly or in part, * * * and not otherwise specially provided for in this section, 30 per centum ad valorem; * * *.

Paragraph 266. All articles made from cotton cloth, whether finished or unfinished, and all manufactures of cotton or of which cotton is the component material of chief value, not specially provided for in this section, 30 per centum ad valorem.

Paragraph 291. Clothing, ready-made, and articles of wearing apparel of every description * * * made up or manufactured wholly or in part, and not specially provided for in this section, composed wholly or in chief value of wool, 35 per centum ad valorem.

* * *

Rubber-faced card cloth, reported by the appraiser to be in chief value of cotton and classified at 30 per cent ad valorem, was protested by Ashworth Bros., Boston, Massachusetts. It was found that rubber is the component material of chief value in the card cloth here in question and therefore dutiable as manufactures of rubber at 10 per cent. [No. 40,712. Before Board 2, March 23, 1917.]

* * *

Sheldon & Co. v. The United States. The chicle latex having been drawn from the tree and coagulated by artificial heat into hard chunks in Mexico, shipped to Canada and there ground and dried, the grinding and drying bearing no relation to transportation and being a process in the manufacture of chewing gum known commercially as desiccated chicle, is dutiable at 20 cents per pound. [United States Court of Customs Appeals, April 2, 1917.]

TRADE-MARK DECISIONS.

President Suspender Co. v. Macwilliam. The facts in the "President" suspender case are as follows: The defendant registered a trade-mark for suspenders and shortly thereafter patented certain features of the particular article to which this mark was applied. After the grant of the patent the plaintiff was given an exclusive license to manufacture and sell the suspenders during the life of the patent. Upon the expiration of the patent the defendant commenced to use the mark and the plaintiff brought suit in the district court. The decision was in favor of the plaintiff and the defendant appealed to the circuit court which affirmed the decision of the lower court.

From this decision it follows that a patentee who gives an exclusive license to another to manufacture and sell a patented article for the life of the patent, and who at the same time transfers the good-will of the business to the licensee, does not retain any trade-mark rights of which he can avail himself either during the life of the patent or on its expiration. [U. S. Trade-Mark Bulletin, March, 1917.]

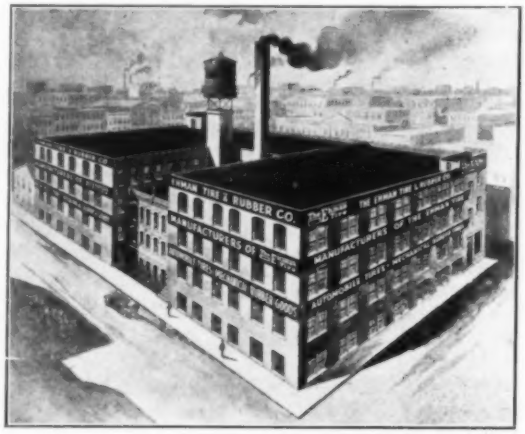
* * *

The Miller Rubber Co. v. Behrend & Rothschild. A manufacturer of toy balloons, who owned a design patent on a toy balloon made in imitation of a watermelon, has failed in an attempt to restrain a manufacturer from marketing a similar balloon. The court held that the design patent was void, and that no one was entitled to the monopoly of a toy balloon made in imitation of a watermelon. [U. S. Trade-Mark Bulletin, March, 1917.]

A Canadian manufacturer of rubber heels having reduced the terms of discounts, the Toronto Shoe Repairers' Association is asking for a reconsideration and requests 15 per cent discount on all orders of a half gross or more.

THE EHMAN RUBBER CO.

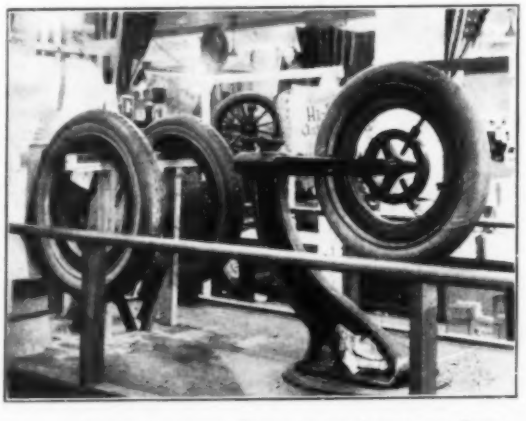
AMONG the progressive rubber manufacturing plants of the middle west is the Ehman Rubber Co., of Twenty-seventh and La Salle Streets, Chicago, Illinois. This company, which is being operated along up-to-date lines, is turning out tires and



Plant of the Ehman Tire & Rubber Co.

mechanical goods of standard quality. The plant, under its present management, has been appreciably extended and plans have already been made for large additions. The new equipment includes up-to-date machinery and devices which contribute so largely to the successful operation of the factory.

A. E. Ehman, president and general manager, has demonstrated by the prompt introduction of available men and methods



Ehman Exhibit at the Rothschild Accessory Show.

that he is an efficiency man in the best acceptance of the term.

The Ehman tire, it is claimed, has already achieved an excellent reputation and is being extensively popularized through an aggressive campaign now in operation by its makers.

At the Rothschild Accessory Show held in Chicago, the Ehman exhibit attracted many visitors. The actual operations necessary in the construction of a pneumatic tire were here shown by an experienced demonstrator, who built up a complete tire on the core, ready for vulcanization.

"Rubber Machinery," Mr. Pearson's newest book, filled with valuable information for rubber manufacturers, is now ready for mailing. Price, $6.

The Obituary Record.

MANY YEARS IN RECLAIMING BUSINESS.

EDWARD MORTIMER MUNDY, treasurer of the Philadelphia Rubber Works Co., died on March 6 of pneumonia, at the advanced age of 81 years.

Mr. Mundy became associated with the late Colonel Nathaniel Chapman Mitchell, founder of the Philadelphia Rubber Works Co., in 1881, and for 30 years held the office of treasurer of the company.

The following resolution was adopted at the last board meeting of the company:

Resolved: That in the death of our treasurer, Mr. Edward Mortimer Mundy, this company has lost a highly valued and faithful officer of unswerving integrity, whose fine qualities of loyalty and kindliness greatly endeared him to all those who had the privilege of being associated with him. The board of directors extend to Mrs. Mundy and to his family the most profound expression of sympathy.

Mr. Mundy was interred at Greenwood Cemetery, Brooklyn, New York. He is survived by his widow and a daughter, Mrs. William G. Davies.

AN EXPERT IN TIRE MANUFACTURE.

James E. Tourtellotte, who died in Philadelphia, Pennsylvania, March 5, was for 21 years connected with the rubber tire business. For 15 years he was superintendent of the Hartford Rubber Works Co., Hartford, Connecticut, and later became general factory manager. At the time of his death he was connected with the Ajax Rubber Co., Inc., at Trenton, New Jersey. He was born at Thompson, Connecticut, September 5, 1857, and was a graduate of the Worcester Polytechnic Institute, Worcester, Massachusetts. A widow and one son survive him.

MANY YEARS WITH ONE COMPANY.

William Volz, assistant secretary of the Eureka Fire Hose Manufacturing Co., New York City, died on April 2, after a brief illness. He entered the employ of the company as office boy 22 years ago, and steadily advanced in usefulness and efficiency, finally reaching the position he held at the time of his death. He is survived by a widow, two children and his mother.

A PIONEER TIRE MAN.

Alexander O. Holroyd, formerly manager of the Prince George Hotel, Daytona, Florida, died in that city the middle of last month. Mr. Holroyd came to this country from England, being identified with the American Dunlop Tire Co. from its beginning, later joining the forces of the Hartford Rubber Works Co., in charge of the automobile tire department, and in 1907 going to Columbus, Ohio, as vice-president of the Midgley Manufacturing Co. In 1909 he left the latter concern to enter the hotel business.

He was a man of pleasing personality and left many friends in the automobile business, and was also popular with tourists wintering in Florida.

FORMERLY A RUBBER SALESMAN.

Elias E. Cox, a veteran of the Civil War, and for more than thirty years identified with the manufacturing rubber industry, died at his home in East Providence, Rhode Island, March 24. He was in his 72nd year and was born at Mount Tabor, Vermont. During the Civil War he served four years in the Seventh Vermont Regiment. He was associated with several rubber concerns in Connecticut and Massachusetts and finally entered the sales department of the National India Rubber Co. at Bristol, about 45 years ago. At the time of the Exposition at Philadelphia, in 1876, Mr. Cox was in charge of the National Rubber Co.'s working exhibit. In recent years Mr. Cox had carried on a laundry business in Providence, but his health had been very poor since last September. He leaves a widow, a son and a daughter.

WELL KNOWN IN THE WEST.

Leland E. English, for 16 years special representative of the Voorhees Rubber Manufacturing Co., of Jersey City, New Jersey, died suddenly of apoplexy at Joplin, Missouri, on April 2.

L. E. English.

Mr. English was born at Sacramento, California, October 17, 1860. He began his career in the trade with the western branch of the Revere Rubber Co., Chelsea, Massachusetts, first as traveling salesman, and then, successively assistant manager and manager of the Chicago branch establishment of that company. He joined the force of Voorhees Rubber Manufacturing Co. 16 years ago, becoming its special representative in the West. He made his headquarters in Joplin, Missouri, but he was one of the best-known men in the trade in every city of the West and Middle West. He was a man of striking appearance, had a broad technical knowledge of the trade, was an indomitable worker, and his wonderful capacity of remembering names and faces was combined with a happy faculty of making friends wherever he traveled. He leaves one son, Drummond English, of Chicago, Illinois.

AN OLD AND VALUED EMPLOYE.

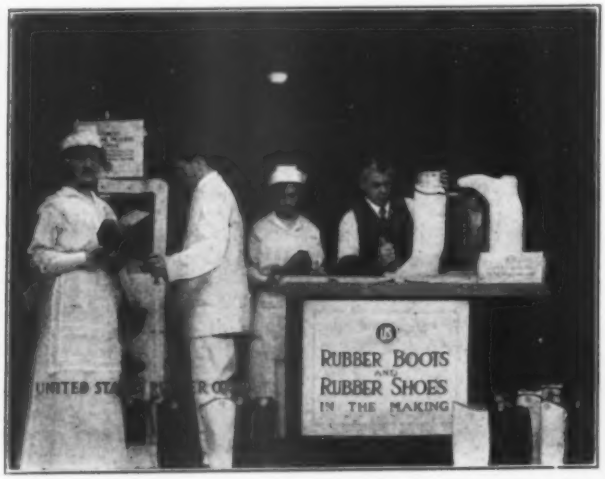
Samuel Gould, for many years in the employ of the American Hard Rubber Co., at its Butler, New Jersey, plant, died at his home in that town recently, aged 63 years.

OZOKERITE IN UTAH.

Ozokerite, which is largely used in insulating compounds and in the manufacture of hard rubber articles, until the present European war, came mainly from Galicia, Austria. Some domestic ozokerite was found in Utah, but not until recently has the American product assumed importance. A deposit in Wasatch County, Utah, which approximates two miles wide and 12 miles long, has been developed within the last year or so. The refining plant at Soldier Summit has a capacity of treating 10 tons of raw material per day, yielding 400 pounds of ozokerite. Changes are contemplated in the process of extraction which it is estimated will enable the plant to handle 1,000 tons of crude material, and proportionately enlarge the output. It is expected that this industry will result in preventing the profitable importation of the Galician product should an attempt be made to do so after the war is over.

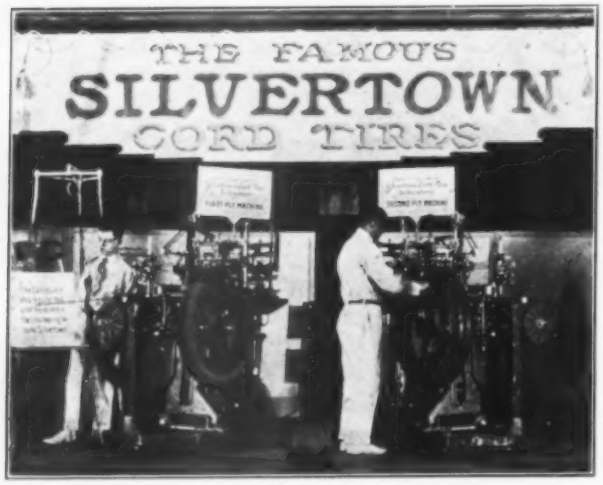
RUBBER MANUFACTURING PROCESSES IN SHOW WINDOWS.

MANY enterprising merchants have found that the most effective show window advertising has been that which has some "live" element in it, and wax models have given way in many cases to real people, whose actions or labors in the windows have resulted in attracting more closely the attention of the passersby. Rubber manufacturers have not been backward in this respect. Last month in THE INDIA RUBBER WORLD mention was made of the manufacture of rubber footwear in



MAKING FOOTWEAR IN A SHOW WINDOW.

the window of the United States Rubber Co. in its Broadway building in New York City, where two men and two women employes were busily engaged in putting together rubber boots and shoes. There was also shown a machine employed to sub-



CORD-LAYING MACHINES IN A SHOW WINDOW.

mit the women's rubbers to heavy atmospheric pressure, thus exploiting the pressure process goods manufactured by that company. On the week of March 19 this company had another exhibit of like character—two young women busily engaged in making bathing caps, while a frame-like orifice at the rear disclosed a third young woman arrayed in bathing cap and costume, whose principal vocation seemed to be to try on one bathing cap after another. Behind her was a background of a seashore scene. These exhibits were viewed by thousands who stopped for a longer or shorter time in order to see and study the processes, or, perhaps, admire the bather.

Another live exhibit by a rubber company was shown in the Boston, Massachusetts, store of The B. F. Goodrich Co., where two patented cord-laying machines were shown in operation under the supervision of experts sent from the Akron, Ohio, factory. These machines, which seemed almost human in their manipulation in laying the cord for the "Silvertown" tires, created much interest during the entire term of their exhibit and must have been of real practical value in familiarizing automobilists with the construction of these tires. This exhibit is being shown in the various cities where the Goodrich company has large retail stores.

It might be well in this connection to mention the patriotic display shown in the window of the United States Rubber Co.'s store in New York City last month. The window was lined with velvet, and the background was a large United States flag above which were several smaller draped flags interspersed with laurel branches, which were also liberally used as embellishments in other parts of the window. In the center of the window on a marble column was a handsome specimen of the American eagle, mounted on a branch, with wings and beak extended, a fine sample of the taxidermist's art. In front of this was a marble bust of Washington and in the immediate foreground a card

BATHING CAPS IN THE MAKING AND WEARING

reading, "For particulars as to location of army and navy recruiting stations in New York and vicinity please apply in store." At the sides of the window were grouped flags of many friendly nations, among them those of Great Britain, France, Russia, Italy, Belgium, Portugal, Serbia, Roumania, Panama, Cuba and Japan. These flags were grouped around standards which were trimmed with a broad blue ribbon, over which was a narrower white ribbon, thus forming the ribbon trade-mark which has been adopted by the company in its advertising. Not only was the window an artistic and attractive one, but it served its mission by calling attention to the need of recruiting at the time.

THERE IS A PROPOSITION BEFORE THE MILWAUKEE CITY COUNCIL TO pass an ordinance, having for its object the elimination of unnecessary noise. Among the provisions are that no whistles shall be blown to start or end the day's work, or at noon or other time, except fire boats, fire engines or steamboats seeking to pass through a drawbridge. Persons making deliveries of any kind between 11 p. m. and 7 a. m. shall wear rubber heels, and milkmen must pad their trays to eliminate noise.

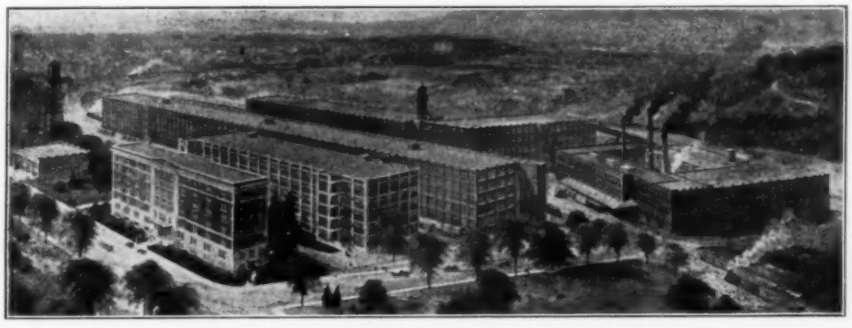
News of the American Rubber Trade.

BESAW TO BUILD IN ARDMORE, OKLAHOMA.

THE BeSaw Tire & Rubber Co., Hartville, Ohio, is obliged greatly to enlarge its capacity and will shortly build a plant in Ardmore, Oklahoma, this site being selected as offering ample housing for employes, natural resources such as oil and gas fuel, and territory now requiring a large consumption of automobile tires. The new factory will have a capacity of at least 500 tires a day and to finance the project properly the capital stock will be increased from $220,000 to $1,000,000. Charles A. BeSaw is president of the company and P. P. Parker, general sales manager.

EXPANSION OF THE FISK RUBBER CO.

This illustration of The Fisk Rubber Co.'s plant at Chicopee Falls, Massachusetts, shows the new mill building which will afford greatly increased tire production, the floor space now devoted to tire manufacture totaling over 29 acres. The new addition is one of the largest single mill buildings in New England, having six floors measuring 600 feet long by 105 feet wide. It is now fully equipped with the mostapproved machinery, operated by unit electric power plants.



PLANT OF THE FISK RUBBER CO., CHICOPEE FALLS, MASSACHUSETTS.

APSLEY RUBBER CO.

The financial statement of the Apsley Rubber Co., Hudson, Massachusetts, as of January 31, compares with the previous year as follows:

	1917.	1916.
ASSETS:		
Cash, notes and accounts receivable	$609,927	$461,560
Inventory	612,061	627,035
Stock investments	.....	57,680
Real estate, machinery, etc.	623,296	580,103
Patent rights and trade-marks	300,000	300,000
Total	$2,145,284	$2,026,378
LIABILITIES:		
Common stock	$500,000	$500,000
Preferred stock	643,300	615,600
Notes payable	380,000	399,573
Accounts payable	218,608	174,199
Surplus	403,376	337,006
Total	$2,145,284	$2,026,378

RUBBER COMPANY SHARE QUOTATIONS.

The following market quotations of shares of rubber manufacturing companies on April 25 are furnished by John Burnham & Co., 115 Broadway, New York City, and 41 South La Salle street, Chicago, Illinois:

	Bid.	Asked.
Ajax Rubber Co. (new)	67½	70
Firestone Tire & Rubber Co., common	129	135
Firestone Tire & Rubber Co., preferred	106½	108
The B. F. Goodrich Co., common	50½	51
The B. F. Goodrich Co., preferred	108½	109
Goodyear Tire & Rubber Co., common	208	213
Goodyear Tire & Rubber Co., preferred	106½	108½
Kelly-Springfield Tire Co., common	51½	52
Kelly-Springfield Tire Co., preferred	85	94
Miller Rubber Co., common	200	210
Miller Rubber Co., preferred	104½	106
Portage Rubber Co.	141	147
Swinehart Tire & Rubber Co.	70	78
United States Rubber Co., common	58¼	59
United States Rubber Co., preferred	106¾	107¼

UNITED STATES RUBBER CO. PENSION PLAN.

The United States Rubber Co. has announced a comprehensive pension plan for its employes, whereby every man and woman who has been continuously in the employ of the company for 20 or more years, either with the parent company or any of its subsidiary companies, and has reached a certain age (namely, men 65 and women 60 years), may be retired on a pension, the amount of which will depend upon the wages or salary received and the number of years the employe has served the company. Retirement from service on pension is optional with the employe under certain conditions, and under other conditions lies in the discretion of the Pension Committee. The smallest amount payable will be $20 per month. Under certain conditions men may be pensioned at the age of 60 and women at 55.

It is expected that the appropriation for the first year will benefit many of the older employes, while the great army of men and women younger in point of service will have the assurance of protection when their efficiency becomes impaired through advanced age. The company will assume such expenditures as may be necessary in administering the plan and no contributions will be required from any employes.

Employes absent on military service for the country will not have such absence deducted from the computation of their years of service, nor constitute a break in the continuity of employment for purposes of the pension benefits. Service for the country will thus be counted equivalent to service for the company.

RUBBER COMPANY DIVIDENDS.

The American Tire Fabric Co. paid a quarterly dividend of 1¾ per cent on first preferred stock on April 2 to stockholders of record March 20.

The United States Rubber Co. has declared a regular quarterly dividend of 2 per cent on first preferred stock, payable April 30 to stockholders of record April 16.

The Westinghouse Electric & Manufacturing Co. paid a quarterly dividend of 1¾ per cent on preferred stock on April 16. Also, a dividend of ¾ per cent on common stock has been declared, payable April 30 to stockholders of record April 5.

The Kelly-Springfield Tire Co. has declared the regular quarterly dividend of $1 a share on common stock, payable May 1 to stockholders of record April 16.

The Hood Rubber Co. has declared a quarterly dividend of 1¾ per cent on preferred stock, payable May 1 to stockholders of record April 26.

The Marathon Tire & Rubber Co. has increased its dividend payable May 1 from the rate of 6 to 7 per cent per annum.

At a meeting held on April 25, directors of The B. F. Goodrich Co. declared a regular quarterly dividend of $1 per share on common stock, payable August 15 to stockholders of record August 3.

TRADE NOTES.

At the annual meeting of The Gutta Percha & Rubber Manufacturing Co., New York City, held on April 4, the old officers were reelected as follows: Henry Spadone, president; Walter W. Spadone, vice-president; Alfred A. Spadone, secretary; George B. Dickerson, treasurer.

The Raw Products Co., New York City, will move on May 1 to 78-80 Wall street, the new quarters comprising a suite of four rooms on the ninth floor.

The general offices of the Republic Rubber Co. of New York, including the mechanical sales department, railroad sales, export sales, and accounting departments, are now located on the fourth floor of the Singer Building, 149 Broadway, New York City, the pneumatic tire sales department and storage rooms remaining at 229 West Fifty-eighth street.

I. J. Cohen & Co., wholesale dealer in rubber, scrap iron and metals, Kansas City, Missouri, has recently moved into a new building at 1,406 West Ninth street.

Work has begun on a new office building for the Republic Rubber Co., Youngstown, Ohio, which will be a duplicate of the present office building, with a connecting link comprising the new entrance, elevator and stairway. The construction will be of reinforced concrete, designed to carry another story when further expansion becomes necessary. It is planned to have this new structure the center unit of a series of three buildings, all to be used for general offices, accounting, etc., including a well-equipped hospital.

The selling corporation, Muller & Phipps (Asia), Limited, whose headquarters are at Englewood, New Jersey, with branch offices in a large number of Asiatic cities, has incorporated its Singapore branch as Muller, Phipps & Sellers, Limited. H. A. Sellers, who was for several years associated with United Engineers, Limited, is managing director.

Byron C. Dowse, former president of the Federal Rubber Manufacturing Co., Milwaukee, and Cudahy, Wisconsin, and formerly one of the chief owners of the G. & J. Tire Co., Indianapolis, Indiana, has formed a new tire manufacturing concern under the name of the Dowse Rubber Co., a certificate of whose incorporation was filed at the office of Secretary of State at Dover, Delaware, with an authorized capital stock of $2,500,000. The general offices and one factory will be in Chicago, Illinois, with another factory in prospect.

The Eagle-Picher Lead Co. announces the removal of its offices to the Architect's Building, 101 Park avenue, New York City.

The Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio, is extending its factory to meet the requirements of a remarkably increased trade in the rubber business, and when the additions to the machine and foundry departments are completed this summer the company will have practically a new foundry, with the floor space about doubled. A new office building is also being erected.

After May 1 the offices of Yglesias & Co., Inc., will be located at 29 Broadway, New York City.

The Red Cross Rubber Co., to be located at Norwalk, Ohio, is the name of a new rubber manufacturing concern which proposes to make rubber novelties. The men interested are Claude Martin and G. M. Switzer, both of Ashland, Ohio.

The Standard Asphalt & Rubber Co., Lawrenceville, Illinois, and the Petroleum Products Co., Independence, Kansas, have recently merged, and the combination will be known as the Sarco Petroleum Products Co. There will be no change in the management or interests identified with the new name.

The Electric Hose & Rubber Co., Wilmington, Delaware, has taken out a $300,000 blanket policy covering the lives of its several hundred employes.

JOHN W. MAGUIRE.

BRIEF mention was made last month of the appointment of John W. Maguire as general sales manager of tires and mechanical rubber goods of the Brunswick-Balke-Collender Co., of Chicago, Illinois and Muskegon, Michigan. Mr. Maguire is well known in the rubber business, having been associated with it since 1894, when he entered the business as salesman for the Trenton Rubber Co. Six years later he became sales manager for the Lake Shore Rubber Co., Erie, Pennsylvania. In 1906 he associated himself with The Republic Rubber Co., Youngstown, Ohio, as general salesman, and since 1911 has been sales manager of the Chicago branch establishment of that company, resigning recently to assume his new position.

J. W. MAGUIRE.

Mr. Maguire is a "live wire," as is shown in his work for the rehabilitation of the Chicago Automobile Club, of which he was recently elected vice-president. He is also a director in the Chicago Automobile Trade Association, and is president of the Gym Knights, an active organization in the gymnasium life of the Chicago Athletic Association.

It will thus be seen that Mr. Maguire brings to the Brunswick-Balke-Collender Co. not only a ripe experience peculiarly fitting him for his new position, but a wide acquaintance and popularity which must conduce to still greater distribution of the lines for which he assumes the sales management.

PERSONAL MENTION.

Harry E. Dennie, formerly connected with the Salt Lake City branch of the Imperial Belting Co., of Chicago, Illinois, has been appointed Western manager, with headquarters at 525 Market street, San Francisco, California.

Alfred Smith, Manchester, England, dealer in rubber chemicals and compounding ingredients, has opened offices at 98 Maiden Lane, New York City, under the management of E. H. Watson.

Herman Gossen, formerly affiliated with the Bothamley Chemical & Extract Co. and the Casella Color Co., is now associated with J. Early Wood, Inc., New York City, having been appointed manager of the Philadelphia, Pennsylvania, office of that well-known chemical house.

Ralph M. Loewenthal, for the past six years sales manager for The Loewenthal Co., at the Brooklyn, New York, office, has recently resigned. Mr. Loewenthal's future plans are as yet unformed, but he will undoubtedly continue in some branch of the rubber industry. His activities when with The Loewenthal Co. included charge of warehousing operations, facilities, system, and supervision of special gradings, manipulations, etc.

A. F. Peterson has been appointed manager of the San Francisco, California, branch of The Fisk Rubber Co., of Chicopee Falls, Massachusetts, succeeding M. H. Whipple.

PROCEEDINGS OF THE RUBBER ASSOCIATION.

THE following cable correspondence between British rubber associations and The Rubber Association of America, Inc., will be read with interest:

London, April 17, 1917.

President Firestone, Rubber Association of America, New York City:
The committee of the Rubber Trade Association of London, on behalf of all members, extend to you, your executive and members, cordial and sincere greetings on the active participation of the United States in the defense of the free peoples. WILLIAM HENDREY, Chairman.

New York, April 23, 1917.

William Hendrey, Chairman, Rubber Trade Association of London, London, England.:
Officers, directors and members of Rubber Association of America unite in reciprocating your greetings. The United States stands ready to make every sacrifice, and we welcome and are proud of the opportunity to fight for our common ideals of humanity and civilization.
FIRESTONE, President, Rubber Association of America.

London, April 20, 1917.

Firestone, President, Rubber Association America, New York City:
Council of Rubber Growers' Association tenders, on America Day, fraternal greetings Rubber Association of America on entry of United States into struggle for preservation of civilization.
ROSLING, Chairman.

New York, April 23, 1917.

Rosling, Chairman, Rubber Growers' Association, London, England:
Officers, directors and members of Rubber Association of America united in reciprocating your fraternal greetings. England and America have common ideals, and the United States stands ready to make every sacrifice for the preservation of our civilization.
FIRESTONE, President, Rubber Association of America.

NEW MEMBERS.--At the Executive Committee meeting held April 5, one associate and eight firm members were elected.

FIRM MEMBERS.

Corona Rubber Reclaiming Co., Germantown, Pennsylvania. Representative, R. B. Caverly.
Stockton Rubber Co., Stockton, New Jersey. Representative, D. G. Price or E. K. Price.
Gillette Safety Tire Co., Eau Claire, Wisconsin, Representative, S. P. Woodard.
The Barrett Co., New York City. Representative, F. J. Barber.
Industrial Chemical Co., New York City. Representative, J. Wrench.
Gaston, Williams & Wigmore, New York City. Representative, D. Gonzales.
Hawkeye Tire & Rubber Co., Des Moines, Iowa. Representative, John T. Christie.
Alexander & Baldwin, Inc., New York City. Representative, C. A. Dann.

ASSOCIATE MEMBER.

Kelly-Springfield Tire Co., New York City. Representative Frederick A. Seaman or Otis R. Cook.

LEGISLATIVE COMMITTEE.—George B. Hodgman, Hodgman Rubber Co., Tuckahoe, New York, volunteered to act as the third member of the Legislative Committee. This committee, the other members of which are Frederic C. Hood, chairman, and H. Stuart Hotchkiss, is actively opposing the proposed tax on crude rubber. As a result of its efforts there is every reason to believe that the war revenue bill will not include crude rubber in the list of materials proposed for taxation.

RUBBER RECLAIMERS DIVISION.—At the meeting held April 11, the circular, "Standards of Scrap Rubber Specifications and Packing" was approved and will be presented for adoption at a conference of the Classification and Conference Committee of the Scrap Rubber Division of the National Association of Waste Material Dealers, and the Reclaimers' Division of the Rubber Association, to be held on May 2.

RUBBER SUNDRIES DIVISION.—The Rubber Sundries Manufacturers' Division met March 30 and voted to establish an "Open Price Exchange Bureau" for the purpose of distributing price information to the members. It is reported that the Bureau will be in operation May 1. A meeting will be held May 4, and in the future such meetings will be held on the first Friday of each month.

EXPORTERS DIVISION.—This division will meet May 4, when the Committee on By-Laws and the Committee on Nominations will present their respective reports.

PROPOSED PROOFERS DIVISION.—A meeting was held on March 26 and preliminary action taken to effect a permanent organization at the meeting held on April 25.

SPECIAL MEETING.—A special meeting of the firm members was held April 26 and changes in the certain amendments to the constitution and by-laws were made to facilitate the work of the Committee on Arbitration.

NATIONAL DEFENSE.—At a joint meeting of the Executive Committee and Rubber Advisory Committee, April 5, a committee consisting of H. Stuart Hotchkiss, Arthur H. Marks and Frederic C. Hood was appointed to represent The Rubber Association of America, Inc., and to offer to the United States Government, through the Advisory Commission of the Council of National Defense, the services of The Rubber Association of America, Inc.

TRADE NOTES.

The Towar Cotton Mills, Inc., Niles, Michigan, is contemplating the enlargement of its mill for the purpose of manufacturing tire fabrics. The mill is now running to capacity on heavy duck, and the company is considering the installation of 40 automatic wide looms, designed especially for weaving tire duck. Scott Towar, of Chicago, Illinois, is president.

The Ellert Rubber Co., F. I. Ellert proprietor and manager, is now located at 1307 Sutter street, San Francisco, California, where a complete stock of automobile tires, tubes and accessories is carried.

The Saginaw Tire Co., Saginaw, Michigan, is equipped for retreading old tires and also carries new tires and tubes. F. C. Louden is general manager.

The Para Auto Tire Co., Chicago, Illinois, distributer for the Vacuum Cup automobile tires of the Pennsylvania Rubber Co., has been awarded a contract by the City of Chicago, Department of Police, for their entire requirements in pneumatic tires for the year 1917; also for the Frank Parmelee Co., and, in addition, the Para company is furnishing these tires as regular equipment to the Marshall Field Co., Mandel Brothers, and other large corporations and commercial houses in that city.

The capital stock of the Dunlop Tire Sales Co., Inc., New York City, has been increased to $250,000.

The C. A. Shaler Co., Waupun, Wisconsin, maker of vulcanizing apparatus, tire tools and accessories, will add two stories, 50 by 50 feet, to its present one-story nickel-plating shop.

The Turner Tire Co., St. Louis, Missouri, incorporated with a capital stock of $13,000 by F. E. Turner, Muskogee, Oklahoma; Charles Neimeyer, Little Rock, Arkansas, and N. W. McLeod, H. V. Stevens and S. T. G. Smith, to manufacture vehicle tires, has been dissolved.

The property of the Alliance Rubber Co., Alliance, Ohio, was sold at public auction by H. C. Koehler, receiver, on April 14. The purchaser was the Sioux City Tire & Rubber Co., and the price paid was $45,000, a figure in excess of the appraised value. The Sioux City company expects to remove the machinery and equipment to its new plant in Sioux City, Missouri. The real estate will be sold.

Fire recently damaged the plant and stock of the McFall Rubber Co., Kansas City, Missouri, to the extent of $40,000, about $35,000 worth of tires and accessories being consumed.

The Colorado Tire & Leather Co., Denver, Colorado, is completing two additional units to its plant, with complete calender, mill and tire equipment. This company is now manufacturing a full line of tires and various rubber accessories for the automobile trade, including fan belts, emergency boots, cement, repair materials, etc., and the new units will enlarge the capacity of the plant approximately 50 per cent.

The Sterns Tire & Tube Co., St. Louis, Missouri, has taken over the $1,000,000 company of the Efficiency Oil Corp., the name of the latter concern being changed to Sterns Tire & Tube Co. on December 6, 1916.

A. D. Phillips, formerly general eastern agent of the Western Maryland Railway, is now traffic manager of The Fisk Rubber Co., Chicopee Falls, Massachusetts, with entire charge of the company's shipping and rating.

E. C. Merkel, formerly branch manager for the Knight Tire & Rubber Co., in Chicago, Illinois, recently resigned to take charge of sales for the Chicago branch of the Federal Rubber Co.

TALMON HENRY RIEDER.

TALMON HENRY RIEDER, who was recently elected president of the Canadian Consolidated Rubber Co., Limited, Montreal, Canada, has had a somewhat phenomenal career. Comparatively few men less than 40 years of age have risen to such high and important position, and fewer still can point to a more steady and rapid advancement, once their proper vocation is found. Born in the little town of New Hamburg, Ontario, Canada, after graduation from the high school at Berlin (now Kitchener), Ontario, he entered the general store of his father at the age of 14 as clerk. Five or six years afterward he became stenographer and also meter reader for the Berlin Gas Company.

T. H. RIEDER.

In 1900 he entered the rubber business as bookkeeper and director of the Berlin Rubber Manufacturing Co., Limited. Three years later he organized the Merchants Rubber Co., Limited, built the plant at Berlin and became managing director. Ten years ago the Berlin and the Merchants companies were absorbed by the Canadian Consolidated Rubber Co., Limited, at which time he was made vice-president and manager of the two companies at Berlin. In 1908 he was elected vice-president of the Canadian Consolidated Rubber Co., Limited, and in 1915 was made general manager, still retaining the vice-presidency. Last month he was elected president.

From a minor position in a small rubber company, to the head of one of the six greatest industries in Canada in the short space of 17 years is an achievement of which he may well be proud. To have done this is an earnest proof of his indomitable energy, his untiring zeal and his executive ability.

W. D. ALLEN MANUFACTURING CO. MOVES.

The new building into which the W. D. Allen Manufacturing Co., Chicago, Illinois, will move about May 1 is shown herewith. The business of this concern in mechanical rubber and brass goods has for some time been beyond the capacity of its former quarters at 133-135 West Lake street, necessitating the rental of warehouse space in three different locations. The new plant is located at Lake and Jefferson streets and has seven stories and basement, with a 61-foot frontage.

W. D. ALLEN MANUFACTURING CO.'S NEW BUILDING.

CANADIAN CONSOLIDATED ANNUAL REPORT.

The Canadian Consolidated Rubber Co., Limited, of Montreal, Canada, according to its annual report for the calendar year 1916, did the largest volume of business in its history. The condensed statement of the Consolidated and constituent companies gives the following figures:

ASSETS.

Property and plants		$6,256,951.87
Inventories, manufactured goods and materials	$5,372,588.25	
Cash	89,043.19	
Accounts and bills receivable	2,319,130.43	
Investments, including good will	4,511,094.79	
Miscellaneous	447,097.71	12,738,954.37
		$18,995,906.24

LIABILITIES.

Preferred capital stock	$3,000,000.00	
Common capital stock	2,805,500.00	$5,805,500.00
6 per cent bonds due October 1, 1946		2,596,500.00
5 per cent debentures due December 1, 1918		2,500,000.00
Bills payable		2,771,244.73
Accounts payable and sundry accruals		1,168,536.57
Reserve for bad debts, depreciation, etc.		846,224.89
Surplus		3,307,900.05
		$18,995,906.24

INCOME.

Net sales, footwear, tires, mechanical and miscellaneous	$12,094,695.51
Cost of goods sold, selling and general expenses, taxes, interest on borrowed money, repairs, depreciations, provisions for bad debts and tire replacements net	11,189,490.42
Net profit from operations	905,205.09
War tax on profits	77,624.80
Net profits remaining with company	827,580.29
Dividends paid on preferred stock	209,979.00
Net addition to surplus	617,601.29
Surplus January 1	2,690,298.76
	$3,307,900.05

All the factories were operated as near full capacity as available and suitable help would allow. Some minor extensions were made at several factories, and there is ample factory capacity for a further increased business, provided a sufficient number of workers can be obtained. Factories have been kept in thorough repair and up-to-date in all respects.

W. G. RYCKMAN INCORPORATES.

The business of W. G. Ryckman, the well-known crude rubber broker, 77 Broad street, New York City, will be conducted hereafter under the name of W. G. Ryckman, Inc. Mr. Ryckman is president, and C. B. Kaufmann, who has been associated with the business for a number of years, is secretary and treasurer of the newly formed corporation. There will be no change in the manner in which the business will be operated, the concern continuing to act as broker, as well as representative in the New York market of various foreign shippers at primary points.

HOOD RUBBER CO. EXTENSION.

The new tire plant of the Hood Rubber Co., East Watertown, will be one of the most thoroughly modern, and fully equipped factories in the country for the manufacture of tires. It is expected to be ready for operation some time this year. As soon as it is equipped and manned, the present output of tires will be trebled. The footwear department is running to full capacity. The line of rubber-soled canvas shoes is so attractive and popular that this branch of the business will be steadily employed well into the summer, while the rubber boot and shoe departments have orders on hand sufficient to keep them going to full capacity through the entire year.

Goodyear Cotton Mills, Inc., paid a regular quarterly dividend of 1¾ per cent on preferred stock on April 2 to stockholders of record of that date.

The name of the Rubber & Celluloid Harness Trimming Co. of Newark, New Jersey, has been changed to the Rubber & Celluloid Products Co., as per certificate filed with the Secretary of the State of New Jersey.

NEW INCORPORATIONS.

Acme Tire & Supply Co., The, March 3 (Ohio), $50,000. H. J. Alperin (president and general manager), Cleveland, Ohio; Morris Levine (secretary and treasurer), Pittsburgh, Pennsylvania. Principal office at 2009 Euclid avenue, Cleveland, Ohio, with branches in Detroit and Kansas City. To establish a chain of stores and garages and expand on a jobbing basis.

Ardmore-Akron Tire & Rubber Co., The, February 17 (Oklahoma), $1,000,000. John C. Harmony and Charles A. BeSaw—both of Canton, Ohio; Elmer S. Wood, Ft. Smith, Arkansas. Location of plant, Ardmore, Oklahoma. Oklahoma City office is 112 Herskowitz Building, Oklahoma City. To manufacture rubber tires and other rubber products.

Atlas Auto Accessories, Inc., March 31 (New York), $50,000. F. X. Carmody, 1114 Ocean avenue, Brooklyn, New York; G. A. McLaughlin, 61 Broadway, and J. T. Condon, 174 West Ninety-seventh street—both in New York City.

Bare Wire Co., Inc., The, April 11 (New York), $500,000. Edwin W. Moore and G. F. Waterbury—both of 10 East Forty-third street; John S. Keith, 40 Wall street—all in New York City. Principal office, New York City. To manufacture water-proof and insulated wire.

Burdick Tire & Rubber Co., March 22 (Delaware), $1,000,000. Herbert E. Latter; Norman P. Coffin—both of Wilmington, Delaware, and Clement M. Egner, Elkton, Maryland. Principal office with the Corporation Trust Co., Dupont Building, Wilmington, Delaware. To manufacture and deal in rubber and gutta percha and all goods of which rubber and gutta percha are component parts.

Commercial Tire & Rubber Co., Inc., March 26 (New York), $1,000. Sydney Bernheim, 35 Nassau street, New York City, and C. A. Weldon, 591 Seventh street; H. H. Jacobson, 555 Grand street—both in Brooklyn, New York. To manufacture automobile tires, etc.

Cossey Tire & Supply Co., February 20, (Oklahoma), $5,000. Wallace Cossey, Cora B. Cossey and J. Frank Davis—all of Muskogee, Oklahoma. Principal office, Muskogee, Oklahoma.

Couchois Tire Corp., April 17 (New York), $50,000. Garrett J. Couchois, Rutherford, New Jersey; Rudolph Tiktin, and Joseph Klingenstein—both of 5 Nassau street, New York City.

Defender Tire & Rubber Co., March 22 (Delaware), $2,000,000. F. R. Hansell, Geo. H. B. Martin—both of Philadelphia, Pennsylvania, and S. C. Seymour, Camden, New Jersey. Principal office with the Corporation Guarantee & Trust Co., Ford Building, Wilmington, Delaware. To manufacture and generally deal in solid and inflated tires and tubes.

Delta Auto Supply Co., Inc., April 4 (New York), $10,000. Alfred V. Hines and Walter E. Ufer—both of 1074 Lexington avenue, and Bailey C. Elliott, 1400 Broadway—all in New York City. To deal in tires and auto supplies.

Dowse Rubber Co., March 14 (Delaware), $2,500,000. John H. Redmond, 10 East Forty-third street; Walter S. Logan, 1142 Madison avenue, and Arthur Nikoloric, 55 Liberty street—all in New York City. To buy, sell, exchange and deal in any and all kinds of property, and to conduct a general trading, manufacturing, mercantile or mechanical business.

Erickson Tire Corp., April 6 (Delaware), $300,000. Wm. Howard Hoople, 277 Brooklyn avenue; Walter Anderson, 1450 New York avenue, and Geo. M. Brooks, 109 West Forty-fifth street—all in Brooklyn, New York. Office with the United States Corporation Co., Dover, Delaware. To buy, sell, manufacture and deal in automobile tires, wheels, and accessories.

Exhausted Heated Vulcanizer Co., March 10 (Delaware), $50,000. John Niason, Chas. W. Griffith and Ed. T. McGowan—all of Altoona, Pennsylvania. Principal office with the Capital Trust Co., Dover, Delaware. To manufacture and retail exhaust heated vulcanizers, automobile accessories and novelties.

Federal Vulcanizing Works, March 2, (Illinois), $2,500. Henry B. Stulik, Otto Horacek, and J. M. Laventhal, 1103 Harris Trust Building, Chicago, Illinois.

Flexible Armored Hose Corporation, April 16 (New York), $50,000. Lester F. Gilbert, 724 Lafayette avenue; Edw. G. Kinkel, 117 Russell avenue, and C. Arthur Dutcher, 257 Elmwood avenue—all in Buffalo, New York.

Forbes Auto Supply Co., Inc., March 15 (New York), $10,000. W. J. Brannen, F. E. Dunbar and R. N. Forbes—all of Olean, New York. To deal in auto supplies, tires, etc.

Frontier Auto Supply Co., Inc., March 12 (New York), $1,000. Samuel W. Caplen, Harold Greenstein and Gerald Landau—all of Buffalo, New York. To deal in tires and other auto supplies.

Giant Tire & Sales Co., Inc., April 12 (New York), $10,000. Jos. M. Johnson, Lenora Z. Johnson, and Arthur L. Dunton—all of Rochester, New York.

Indian Tire Sales Co., Inc., March 31 (New York), $10,000. David B. Parker (president), 2657 Bainbridge avenue; Joseph M. Hetzer (vice-president and general manager), 152 West Sixty-fourth street—both in New York City, and John Barnett (secretary and treasurer), 1559 East Twelfth street, Brooklyn, New York. Factory at New Brunswick, New Jersey, and New York branch and service station, 246 West Sixty-fifth street, New York City. Distributer for the Indian Tire & Rubber Co., New Brunswick, New Jersey, manufacturer of solid rubber tires.

India Rubber Co., The, December 1, 1916 (Ohio), $250,000. J. M. Alderfer (president); J. K. Williams (vice-president)—both of Akron; D. A. Grubb (secretary), Cleveland, and Paul C. Searles (treasurer), East Cleveland—all in Ohio. To manufacture automobile tires and inner tubes.

Illinois Tire & Supply House, February 26 (Illinois), $5,000. James W. Bell, Paul E. Sheehan and Willis Melville. Principal office, Hilgrove and Fifth avenue, La Grange, Illinois.

Manufacturers' Tire & Rubber Co., Inc., The, January 9 (New Jersey), $100,000. Eric Windmiller, 43 High street, Passaic; Herman Feder, 335 Belmont avenue, Newark—both in New Jersey, and Justin S. Galland, 25 Broad street, New York City. Principal office, 218 Halsey street, Newark, New Jersey. To manufacture and deal in automobile tires and tubes, etc.

Meyer Rubber Co., The, October 18, 1916 (Ohio), $100,000. A. W. Ellenberger, C. A. Walter, Fred W. Hachel, O. M. Roderick, and E. L. Mallory. Principal office, Massillon, Ohio.

National Rubber Co. of New York, March 22 (Delaware), $5,000,000. F. R. Hansell, Geo. H. B. Martin—both of Philadelphia, Pennsylvania, and S. C. Seymour, Camden, New Jersey. To buy, sell and deal in crude, refined and manufactured rubber.

The New Idea Double Tire Co., Inc., March 30 (New York), $2,500. Ella A. Rosenbloom and Samuel Rosenbloom—both of 10 Suter Terrace, and Henry Johnson, 801 Dewey avenue—all in Rochester, New York.

Nesbit Sales Corporation, F. T., March 15, (New York), $10,000. Frank T. Nesbit and Thorpe D. Nesbit, 468 Riverside Drive, and William N. C. March, 42 Broadway—both in New York City. To manufacture motors, engines, supplies, etc.

Niagara Vulcanizing Works, Inc., April 17 (New York), $2,000. John Dietz, 357 Fifth street, Glenn A. Stockwell, 463 Eighth street—both of Niagara Falls, and Enoch Layer, 277 Prospect street, Lockport—all in New York. To repair tires, etc.

North Star Rubber Co., October 20, 1916 (Minnesota), $250,000. J. C. Spillane, S. H. Greeley, and J. W. Laramy—all of St. Paul, Minnesota. Principal office, St. Paul, Minnesota. To manufacture all kinds of merchandise of rubber and gutta percha.

Pacific Tire & Rubber Co., March 16 (Washington), $10,000. Ardo M. Peterson, Roy Peterson, and Leon E. Peterson—all of Seattle, Washington. To deal in automobile tires and accessories.

Pacific Tire & Rubber Co., Inc., April 3 (New York), $2,000. Sydney Bernheim, 35 Nassau street, New York City; C. A. Weldon, 591 Seventh street, and H. H. Jacobson, 555 Grand street—both in Brooklyn, New York.

Pacific Tire & Rubber Co., January 11 (California), $500,000. H. C. Wharfield, Otto Hasencamp, E. C. McDowell, Hugh K.

Walker, Jr., and H. C. Natter—all of Los Angeles, California. Principal office, Los Angeles, California.

Phoenix Rubber Co., The, March 19 (Ohio), $125,000. Theodore Krumeich (president), F. R. Ormsby (vice-president), C. C. West (treasurer), and S. G. Ridgon (secretary and general manager). To reclaim rubber.

Plastic Inlay Rubber Co., March 26 (Delaware), $500,000. F. D. Buck, Geo. W. Dillman and M. L. Horty—all of Wilmington, Delaware. To manufacture and sell automobile tires and tire tubes and rubber goods of all kinds.

Plexas Tire & Rubber Co., February 13 (Pennsylvania), $50,000. William W. Moore (treasurer), 1338 Sixty-fifth avenue; Frederick Doriety, 4718 N. Twelfth street, and Walter Hess, 4914 Cedar avenue—all in Philadelphia, Pennsylvania. Principal office, Philadelphia, Pennsylvania. To manufacture, buy and sell rubber goods, automobile tires, tubes, accessories and any other articles of similar character.

Pneumatic Wheel Co., March 9 (South Dakota), $2,000,000. Kay Todd, Walter Fosness, Arthur E. Nelson, and A. M. Joyce—all of St. Paul, Minnesota. Principal office, 510-512 Endicott Building, St. Paul, Minnesota. To manufacture the J. A. Borland wheel with solid rubber tire invented by Mr. Borland.

Porter Tire Sales Co., Inc., March 28 (New York), $500. Daniel B. Nally, 125 Wall avenue, Mt. Vernon, New York. Thos. F. MacMahon and Bailey C. Elliott—both of 1400 Broadway, New York City.

Quality Tire Co., Inc., April 17 (New York), $1,000. Sydney Bernheim, 35 Nassau street, New York City; Catherine A. Weldon, 591 Seventh street, and Harry H. Jacobson, 555 Grand street—both in Brooklyn, New York.

Resilient Fibre Co., March 5 (Delaware), $500,000. Geo. B. McLeod, Lumberton, North Carolina; Edwin D. Chadwick, W. E. Brockman, J. L. Alverson, J. P. Price, and W. F. Eller—all of Washington, D. C. Principal office with the Corporation Co., of Delaware, 901 Market street, Wilmington, Delaware. To manufacture and sell a certain resilient fibre made of cotton or other material.

Republic Rubber Sales Co., February 21 (Ohio), $10,000. John T. Harrington, Union C. Deford, Fred J. Hein, Clyde W. Osborn and J. W. Blackburn. Principal office will be located at Youngstown, Ohio. This company is formed to handle the sales of The Republic Rubber Co., of Youngstown, Ohio.

Saniton Specialty Co., Inc., April 7 (New York), $5,000. Herman Stang, 1051 Boston Road, Joseph I. Wiesner, 706 East Sixth street—both in New York City, and Nicholas Lawner, 1626 Forty-fifth street, Brooklyn, New York.

Smoth Rubber Sheeting Co., Inc., March 28 (New York), $5,000. Louis B. Silver, 864 Fox street; Louis Rosenbloom, 937 East 172d street, and John J. Hanley, 65 Fourth avenue, all in New York City.

Stylux Manufacturing Co., Inc., March 29 (New York), $10,000. E. A. Falk, 150 East Sixty-first street; Harry E. Herman, 170 Broadway—both in New York City, and Jeanette A. Bravy, 254a Saratoga avenue, Brooklyn, New York. To manufacture rubber, cement, paints, etc.

United Vulcanizing Co., Inc., April 10 (New York), $500. Anthony Fenninger, 565 Amsterdam avenue; Hermann Wurm, 246 West 106th street, and Jos. A. Fenninger, 1328 Edwards avenue—all in New York City. Tire repairing, etc.

Valley Tire Co., March 13 (Tennessee), $5,000. Albert Wooldridge, Latham Wooldridge, O. N. Wilkins, R. F. Katz, and E. G. Riddick. Principal office, Nashville, Tennessee, to buy and sell autos, tires, etc.

Western Tire Brokerage Co., March 23 (Missouri), $4,000. John C. Shaffner, Mabel L. Bartling, and Josephine C. Turner—all of St. Louis, Missouri. Principal office, St. Louis, Missouri.

THOMAS L. ROBINSON.

ALTHOUGH perhaps having a wider experience in financial and legal circles than in rubber manufacture, the subject of this sketch occupies the important position of president of the Republic Rubber Co., Youngstown, Ohio, and during the seven or eight years that he has been connected with it, the company has shown steady and material progress.

THOMAS L. ROBINSON.

Thomas L. Robinson was born in Ravenna, Ohio, June 28, 1880. His father was a prominent jurist. Among his ancestors he can count those who were officers or soldiers in the three principal American wars, the Revolution, the War of 1812, and the Civil War.

After completing his education at Western Reserve Academy and the University of Michigan, Mr. Robinson entered the practice of law at Youngstown, Ohio. In 1907-8 he organized the Wick Brothers Trust Co. and became its president. This was later consolidated with the Dollar Savings & Trust Co., of which he was made vice-president. He became a director of the Republic Rubber Co. in 1910, and the next year was elected its president, an office he has held ever since.

Mr. Robinson is a public-spirited man, prominently connected with other institutions in Youngstown. He is a director in the First National Bank, the Realty Trust Co., the Union Safe Deposit Co., and is interested in other local institutions. He is a member of the Youngstown Club, the Youngstown Country Club, Poland Country Club, Zeta Psi, Phi Delta Phi and Phi Beta Kappa fraternities, Military Order of Loyal Legion, Sons of American Revolution, Ohio Society of New York, the Bankers' Club of New York, and The Rubber Association of America, Inc.

COTTON FABRIC TRADE NOTES

THE Bibb Manufacturing Co., Columbus, Reynolds and Macon, Georgia, has just completed a mill at Porterdale, Georgia, with 20,000 spindles and 100 looms for manufacturing cotton duck.

* * *

O. A. Barnard announces that he has severed his connection with the firm of J. H. Lane & Co., New York City.

* * *

The Cannon Manufacturing Co., Concord, North Carolina, is enlarging its plant to add to its product the manufacture of tire fabrics, which, like the present output, will be sold through Cannon Mills, New York and Philadelphia.

* * *

Clarence F. Holmes, formerly secretary of R. J. Caldwell Co., Inc., New York City, is now associated with the Butterick Publishing Co., New York City.

THE DECLINE OF RUBBER IN PHOTOGRAPHY.

JUST as the march of progress is ever creating new uses for india rubber, so it occasionally eliminates a few of the earlier applications, for the history of scientific development is also a record of the survival of the fittest. However well rubber, or any other substance, may perform the function required of it, a new process or substitute device may at any time revolutionize the art to which that substance had been applied and so relegate it to the limbo of the past. In photography, for instance, the applications of rubber are gradually but surely diminishing in number. While in a sense regrettable, this side of the rubber industry in any field presents beneficial lessons deserving more than passing thought, and it is in this spirit that the following instances are cited.

Only two or three years ago most cameras had a rubber bulb and tube to operate the shutter. This equipment had to be replaced frequently and for the most part has now been replaced by the antinous or flexible cable release which conveys no vibration to the camera yet will last as long as the camera itself. While hard rubber still supplies the leaves and iris diaphragm of many shutters and lenses, as many more now on the market and made of very thin sheet steel are giving satisfaction and have the advantage that they never crack where pivoted. Hard rubber plate-holder slides have for the most part given way to leatherboard and other specially prepared cardboards of smooth, hard surface. These are cheaper and do not become electrified by friction in handling nor attract dust to the plate like hard rubber. Developing trays and tanks of hard rubber are still stocked by most photo-supply dealers, but seem to render no better service than the cheaper receptacles of glass, fiber, agate and artificial stoneware.

India rubber cloth, by which is meant cotton fabric coated on both sides with a thin film of rubber, still has its photographic uses, although not to the former extent. India rubber focusing-cloths are opaque, as such cloths should be, and are of additional value in protecting the camera during bad weather. Cut pieces of rubber fabric or sheet rubber have long been employed in the printing-frame, back of platinum paper, as a protection from dampness. Once finished, however, a platinum print is a thing of rare beauty and as near absolute permanence as anything known to photography, but the scarcity and high cost of platinum have restricted the use of this medium, and like all sun-printing papers it is gradually giving way to the more easily worked gaslight papers.

Another printing accessory now rarely seen is the squeegee-pad for glazing prints to a high gloss surface. It consists of a sheet of celluloid placed between two covers of india rubber cloth, the wet prints being applied face down to both sides of the celluloid, the rubber covers brought over them and a roller squeegee being applied over the fabric to bring print and celluloid into close contact for drying. Photographers gradually came to the conclusion, however, that the rubber sheeting was superfluous, and that the ferrotype tin of today lasts longer, gives a better gloss and is less likely to stick to the print. And here again low first cost also became a contributing influence.

In photographic processes rubber is holding its own better than in apparatus and accessories, although the amount consumed in the former is inconsiderable. It found favor for a time as a mountant of glazed and dry prints without cockling, a solution being prepared with carbon disulphide and 5 per cent absolute alcohol. It was discovered, however, that the rubber perishes in time and leaves the mount.

Pure washed and masticated, unvulcanized rubber was formerly employed as an edging for wet-plates to prevent the collodion coating from leaving the glass, but the faster gelatine dry-plate has superseded its predecessor for all work except photo-engraving, and is making inroads upon that field as well.

In the collotype process of ink printing from a specially prepared photographic glass positive, india rubber solution is used for attaching to the negative the tinfoil used for masking, but the collotype process has fallen into disfavor to a considerable extent, with the development of half-tone, photogravure and other etching methods.

In photo-engraving, a solution of india rubber in benzol of 2 per cent strength is used for stripping wet collodion films. The collodion negative is flowed with the rubber solution, and when this is dry it is again flowed with stripping-collodion. The rubber solution prevents the solvents of the stripping-collodion reaching the original collodion film, and at the same time increases the flexibility and toughness of the film.

India rubber solution continues to be used in aerograph or air-brush retouching because it possesses a distinct advantage over other stopping-out mediums applied to shield certain portions of the print on which the aerograph spray is not wanted. Whereas most other mediums require the application of a solvent for their removal after the spraying has been completed, the rubber film peels off easily upon rubbing with the finger-tip and carries with it any spray that may have spread beyond the desired boundaries.

Thus the instances cited make it plain, were this necessary, that no primary use of rubber will persist unless rubber in its particular application has important, desirable qualities and distinct advantages peculiar to itself; also that as an accessory its continuance is dependent upon the fate of the device or process in connection with which it is employed. It cannot long compete with substitutes of lower cost which answer the purpose equally well. The big rubber markets will ever be associated with those articles greatly in demand which cannot be manufactured of any other substance.

DAYTON RUBBER MANUFACTURING CO. BUILDS MODEL PLANT.

Building operations have begun on the new plant of The Dayton Rubber Manufacturing Co., Dayton, Ohio. The site comprises 21½ acres of ground, with a frontage on the Pennsylvania Railroad of about 1,500 feet, affording ideal shipping facilities. The main building will be about 500 feet in length and 150 feet in width, part of which will be one story 20 feet high and part three stories, and is so planned that plenty of light will be provided in all parts of the plant, which will be constructed of structural steel, concrete and brick.

The second story will be used for offices and the third story will be arranged for a large hall for the employes and their friends. The ground not occupied by buildings will be set aside for a ball field, tennis courts, etc., for the benefit of employes. The power plant will occupy a separate building, 70 by 90 feet, and the boilers will all be equipped with stokers to eliminate smoke.

The Dayton company manufactures both airless and pneumatic tires, and the new plant will have a capacity of 1,000 tires per day, nearly 1,000 men being employed. John A. MacMillan is president and general manager.

DU PONT COMPANY ACQUIRES HARRISON BROTHERS PROPERTY.

Through the purchase of Harrison Brothers & Co., Inc., Philadelphia, Pennsylvania, by E. I. du Pont de Nemours & Co., Wilmington, Delaware, two of the oldest manufacturing concerns in this country have united, the Harrison business dating from 1793 and that of the du Pont from 1802. The new corporation conducting the business of Harrison Brothers in chemicals and pigments will be known as Harrisons, Inc., but the organization remains practically the same.

The Mantua Chemical Co., Camden and Paulsboro, New Jersey, a part of Harrison Brothers, is also included in the transfer to the du Pont company, the business being continued under the name, Mantua Chemical Co.

LEE RUBBER AND TIRE CORPORATION REPORT.

In presenting the first annual report of the Lee Rubber & Tire Corp., Conshohocken, Pennsylvania, A. A. Garthwaite, president, stated that the discontinuance of dividends at the January meeting was due to the high cost of materials and additions to the plant and equipment, which will result in benefit to the stockholders.

The treasurer's report follows:

CONSOLIDATED BALANCE SHEET.

December 31, 1916.

ASSETS.

Cash	$258,560.45	
Accounts receivable	349,777.42	
Notes receivable	8,414.85	
Lee Tire Sales Co., Inc., N. Y., current account.	112,312.83	
Inventories	1,601,442.70	$2,330,508.25
Charges deferred to future operations		28,540.90
Investment—stock of Lee Tire Sales Co., Inc., N. Y.		500.00
Plant and equipment		1,206,229.11
Patents, trade-marks, etc		400,300.00
		$3,966,078.26

LIABILITIES.

Accounts payable and accruals	$75,814.37	
Notes payable	1,000,000.00	$1,075,814.37
Reserves:		
Depreciation of plant and equipment	$191,661.35	
Adjustment of tire claims	38,633.19	
Income tax	9,982.87	240,277.41
Declared capital, in accordance with the Stock Corporation Law of the State of New York	$750,000.00	
Stock—Authorized 150,000 shares		
Unissued 50,000 "		
Outstanding 100,000 "		
Working capital, being cash and actual book value of securities owned in excess of required declared capital	1,883,591.09	2,633,591.09
Surplus		16,395.39
		$3,966,078.26

CONSOLIDATED PROFIT AND LOSS AND SURPLUS ACCOUNT.

For the Year ended December 31, 1916.

Net sales	$3,587,761.29
Cost of goods sold, including freight, selling, administrative and general expenses	3,340,860.29
Gross operating profit	$246,901.00
Income from rentals, etc	4,162.16
	$251,063.16
Deduct:	
Reserve for income tax	$9,982.87
Interest and discount—net	3,743.29
	13,726.16
Net profit for year	$237,337.00
Less dividends paid	225,000.00
Surplus for year	$12,337.00
Add adjusted surplus January 1, 1916	4,058.39
Surplus December 31, 1916	$16,395.39

HORACE C. COLEMAN, Treasurer.

The recently elected officers and directors of this company are as follows: John J. Watson, Jr., president; A. A. Garthwaite, vice-president and treasurer; D. W. Pinney, assistant treasurer and assistant secretary; Henry Hopkins, Jr., secretary. Directors: John J. Watson, Jr., J. W. Prentiss, G. M. P. Murphy, Stephen B. Fleming, Samuel H. Miller, all of New York City; Jos. Wayne, Jr., Philadelphia, Pennsylvania; J. W. Johnson, New Brunswick, New Jersey; Horace C. Coleman, Norristown, Pennsylvania; A. A. Garthwaite, Conshohocken, Pennsylvania.

PROGRESS OF CROWN TIRE & RUBBER CO.

The Crown Tire & Rubber Co., now located in temporary quarters in Ralston, Nebraska, a manufacturing suburb of Omaha, expects to occupy its new plant by July 1. The new building will be 130 by 60 feet, three stories high, with a separate boiler house about 30 feet square. This will afford a daily capacity of 500 automobile tires and tubes, and the company will also manufacture motor cycle tires, tire accessories, and, eventually, mechanical rubber goods. H. A. Reichenbach is president and general manager, and E. A. Miller, formerly of Akron, Ohio, superintendent.

THE RUBBER TRADE IN AKRON.

By Our Regular Correspondent.

A VALUABLE contribution to the industrial progress is embodied in the recent establishment by several Akron rubber factories of 30 scholarships in the engineering college of the Municipal University of Akron. The candidates will be chosen from high school graduates and the scholarships will cover all tuition, incidental and laboratory fees. The course will be on a cooperative basis, including alternate two-week periods in factory and college, thus bringing the student into practical relation with the various problems in every department of the industrial organization. Each student will receive from the company employing him, $37.50 for each two-week period of work, and at the end of the four-year course will have the opportunity of a permanent position in the organization in which he has been trained.

* * *

The proposed trebling of capacity in the plant of the Mason Tire & Rubber Co., at Kent, to 1,500 tires per day necessitates additional working capital and an increase from $1,000,000 to $3,000,000 was ratified at the stockholders' meeting on the fifth of last month. The company started manufacturing tires in October, 1916, and its growth has been remarkably rapid. Over 200 distributers and dealers in the United States now handle Mason tires and tubes, and three direct factory branches are maintained in New York City, Cleveland, Ohio, and Kansas City, Missouri. A large warehouse is now under construction at the home plant, a modern office building will be erected this summer, and the main plant extensions will begin in the early fall. The architects' drawing of the completed factory is shown in the accompanying illustration.

MASON TIRE & RUBBER CO. PLANT WITH PROPOSED ENLARGEMENT.

* * *

The B. F. Goodrich Rubber Co. has recently been organized as the selling organization of The B. F. Goodrich Co. The Goodrich products will henceforth be identified with the new name, the original company, however, remaining as the owning and operating concern.

Several officials of the Goodrich company, acting as individuals, have solved the high cost of living problem by fitting up a club house with accommodations for 50 men. The name of the new club is the "Chelsea" and its present members, numbering 20, find the cooperative plan of living more economical and also more enjoyable. The club house is three stories high, with ten large rooms and a dormitory occupying the entire third floor. It is reported that the Chelsea Club is the pioneer in a series of similar experiments for single men employes.

* * *

The metric system for determining weights and measures, standard in all European countries, has now been adopted by The

Goodyear Tire & Rubber Co., and classes in the Goodyear factory school have been organized among the foremen and inspectors of the plant, that they may become thoroughly familiar with the system before applying it to the activities of the factory. Our United States monetary system, with its decimal denominations, is really a division of the metric system, which has the same advantage over our old method of weights and measures with their units of inches, pounds, quarts, etc., that our system of coinage has over the pounds and shillings of Great Britain or the francs and sous of France.

Building operations may soon begin on Goodyear Hall, a $450,000 building for the exclusive benefit of Goodyear employes. The size of the building will be 170 by 400 feet over all, the front four stories high and the rear two stories. An immense gymnasium, with a seating capacity of 5,000 and swimming pool adjoining, will provide opportunity for all kinds of indoor athletics, and there are to be school rooms, lounging, smoking and reading rooms, and complete equipment to supply the entire recreational needs of the large Goodyear working force.

The Goodyear company also has a fine athletic field of 40 acres, and Coach I. Ray Martin, for the past three years director of athletics at Heidelberg University, Tiffin, Ohio, has recently been appointed athletic director of the company.

* * *

At a stockholders' meeting on the tenth of last month, the capital of the Swinehart Tire & Rubber Co. was increased from $800,000 to $1,500,000, $200,000 in common stock and $500,000 preferred. The regular quarterly dividend was declared.

* * *

The Miller Rubber Co. has installed a new fire alarm system comprising the modern equipment of signaling apparatus with ten alarm boxes operated by breaking the glass and pulling the lever. These new call boxes and the factory whistle will automatically sound the number of the box four times in quick succession.

* * *

M. D. Tenney, for many years connected with the factory organization of the Kelly-Springfield Tire Co., has been appointed manager of the adjusting and salvage department, succeeding R. B. Pierce, now manager of the Cleveland branch.

THE RUBBER TRADE IN BOSTON.

By Our Regular Correspondent.

NEVER before has the National Guard in this vicinity been supplied with rubber overshoes. Last month, simultaneously with the declaration of war, New England was visited by a heavy snowstorm—one of the left-overs of last winter. It was deemed necessary to guard a number of points in or near Boston, and the inclemency of the weather, the soft, slushy condition of the ground where these men were picketed, and the fact that many of them were not supplied with shoes calculated to withstand such service, was quickly recognized, and at once orders were given to supply these soldiers with rubbers. The kind decided upon were heavy storm overs, and it was at once found that few such rubbers were in stock in the various wholesale houses. After considerable scurrying around, the Hood Rubber Co. and the United States Rubber Co. filled the order, and the sentinels were enabled to patrol their beats in greater comfort.

* * *

A proof of the growing interest in the history and methods of rubber manufacture is the steady demand by schools, colleges, clubs and debating societies for samples of rubber and compounding ingredients. Probably every rubber manufacturer has requests for such samples every week in the year. While an individual fulfilment of such a request would not be very great, even at present rubber prices, the aggregate cost of the large number would involve a considerable amount, both for material and time. So great has been this demand that the Hood Rubber Co., Watertown, has seized the opportunity to popularize its products and make friends with the many persons or institutions asking for such favors and has had prepared an "Educational Exhibit." This consists of a neatly boxed card, to which are attached samples of various kinds of rubber, vials of the most prominent compounding ingredients and miniature aluminum boot and shoe lasts. These exhibits, which fill the wants of school teachers, are sold at a dollar each, and as they contain an advertisement of the company are, at the same time, of real publicity value.

* * *

The United States Rubber Co., having completed its pension plan, decided that the details should be given to the employes of its subsidiary companies by the officers of those companies. There are many employes in these companies who are of foreign birth, and some who might not fully understand that they were included among the prospective pensioners of the United States Rubber Co. An interesting feature of this announcement was the address given by Vice-President Ira F. Burnham at the Stoughton factory of the American Rubber Co. As several nationalities are represented among the workers there, Mr. Burnham called all the employes together and asked them to group themselves according to the language with which they were most familiar. An interpreter was stationed with each group and Mr. Burnham then explained in English, a paragraph at a time, the new pension plan. After each point was explained, the interpreters addressed their groups. Questions were propounded, which were answered by Mr. Burnham, and when all the groups fully understood this point, another was explained in like manner. The workers felt free to ask questions, as they would not be inclined to do, were the meeting formal, with only one speaker and he talking English on a platform. The plan was admirably conceived and excellently worked out, with the result that Mr. Burnham has been invited to explain the plan in other plants of the United States Rubber Co.

* * *

The Monatiquot Rubber Works Co., South Braintree, departed from its regular custom of celebrating its birthday, because of war conditions. In order that its employes might participate in the public celebration of Patriot's Day the factory was closed down. In posting notices in the various departments, notifying of the shut-down, announcement was made of a ten per cent increase to all who had been employed more than three months. The dedication of mill building No. 4, which had been arranged to be held April 19, was postponed, and if present plans are carried out, will take the form of an old-fashioned party given to the employes and their families.

* * *

Ten simultaneous flag raisings, one each on the ten principal buildings of the Boston Woven Hose & Rubber Co., Cambridge, on April 11, were accompanied by a procession of 1,750 employes, headed by a fife and drum corps, led by Vice-president and Manager George E. Hall, Treasurer Henry B. Sprague, Mayor Rockwood and the heads of the fire, police and building departments of the city of Cambridge. At the close of the parade the entire company assembled in the large factory yard, where, to the accompaniment of the fife and drum corps, and the factory bugler, the "Star Spangled Banner" was sung by all present.

* * *

The importance of air-brake hose was exemplified at the South Terminal Station in this city one day last month, when a large number of trains arriving in Boston were held from 15 to 30 minutes, causing a serious track congestion. A train was backing out of the station when the air-brake hose collapsed. This set the brakes on all the cars, and the only way to release the brakes was to do so with each individual car, a process which took half an hour to accomplish. This happened in that part of

the yard where many tracks converge or cross each other, thus holding up trains entering or leaving the station.

* * *

F. H. Appleton & Son, Inc., rubber reclaimer, has become a Massachusetts corporation, though originally incorporated under Maine laws. No change has been made, either in the list of officers and directors, or in the capitalization, which is $400,000.

* * *

The trustees of the Forsyth Dental Infirmary on April 10 tendered the use of this establishment to the National Government, through Senator Lodge. The condition of soldiers' teeth is of prime importance in time of war, and this great infirmary, given to the City of Boston by a rubber manufacturer, is probably the finest of its kind in the world.

* * *

The Lynn Rubber Manufacturing Co. is now making an arch support for wearing in the shoe for the relief and correction of fallen arch, which is composed partly of sponge rubber, thus forming an elastic cushion, exerting a gentle pressure at the point needed.

* * *

Dan C. Swander, manager of the Boston store of the Firestone Tire & Rubber Co., resigned that position last month to become sales director of the Standard Parts Co., Cleveland, Ohio, a combination of several companies, including the Western Spring & Axle Co., the Perfection Spring Co., the Standard Welding Co., Cleveland, and the Bock Bearing Co., Toledo, Ohio. It is reported that the company will employ 8,000 to 9,000 men in the various plants and consume 175,000 tons of steel annually. Mr. Swander has been connected with the automobile and tire industry for a number of years, and has been very successful as a sales organizer and builder.

* * *

Jack T. Clinton succeeds Mr. Swander as manager of the Boston branch of the Firestone Tire & Rubber Co. For several months last year he was acting manager of this store, and later was appointed manager of the Buffalo branch of the company. His friends in the trade, and especially those in Boston, are congratulating him on his advancement and his return to this city.

* * *

Forty students of Harvard University, who are specializing in chemistry under the guidance of Professor Jones, made a tour of inspection of the Hood Rubber Co. factory at Watertown recently. Every office employe of the company is now wearing an American flag as an emblem of patriotism in this critical time, while every office is decorated with the Stars and Stripes.

* * *

The bowling league of the Hood Rubber Co., Watertown, celebrated the closing of the season by holding its sixth annual banquet at Convention Hall in this city, April 12, more than 300 being present. Prizes were awarded and the minstrel troupe furnished entertainment. This troupe also gave a special performance at Nutting's boathouse, on the Charles river, raising a goodly sum for the American Red Cross Society.

* * *

The Fisk Social and Athletic Association of The Fisk Rubber Co., Chicopee Falls, has offered to the United States Government, for mobilization purposes, its athletic field in Springfield. This park contains 45 acres, has stable accommodation for 150 horses, water from the city mains, is on a line of trolley cars and not far from two main line railroads from which a spur track could easily be laid. The Fisk Rubber Co. stands behind this offer to the Government, and if it is accepted, will provide an athletic field for its employes in some other location.

* * *

The Boston Chamber of Commerce has under consideration the creation of a Foreign Trade Bureau or a Foreign Trade Council. A committee of five has been appointed to consider its feasibility and, if possible, to formulate a plan for such an organization.

* * *

The Converse Rubber Shoe Co., Malden, which manufactures tires as well as footwear, has increased its authorized amount of common stock from $75,000 to $375,000, and will use $285,000 of the increase to pay a 380 per cent stock dividend. The remaining $15.000 will be left in the treasury. The company now has $1,375,000 preferred and $375,000 common stock authorized.

* * *

The Para Rubber Co., dealer in tires and mechanicals, formerly at 112 High street, has moved to a larger store at 43 High street.

* * *

Francis H. Appleton has just returned from a vacation at Virginia Hot Springs, where he spent much time on the golf links, with the result that he weighs no more to-day than he did prior to his departure from Boston.

THE RUBBER TRADE IN TRENTON.

By Our Regular Correspondent.

GEORGE GRAHAM, JR., assistant treasurer of the Delion Tire & Rubber Co.; John Carter, plant superintendent, and Harry A. Pfitzinger, head bookkeeper, are at St. Francis Hospital in a serious condition as a result of an explosion and fire at the Delion plant. Thomas Curtis, employed as an expert machinist by the Thropp company, who happened to be at the tire factory when the explosion occurred, is also at the hospital. The men were terribly burned about the face and arms and it is feared some of them may not recover their sight.

These men, together with several mechanics, were assisting in or watching the frictioning of some stock, in the process of which a new compound was being used. They were watching the action of this compound when a spark from the machine caused an explosion. The compound was plastered into the faces of those nearest the machine. In another instant flames were shooting through the room and it was with difficulty the men were saved from being burned to death. A dozen workmen employed about the room were painfully burned. A large amount of stock in the room was ruined, but the flames did not disable the plant. This is the second fire to visit the Delion factory. The plant is unusually busy and a new addition is now under way. When this is completed it will enable the factory to double its output.

* * *

The Ajax Rubber Co. has taken possession of its extensive new factory addition, which relieves a badly congested condition at the main factory adjoining. The new plant enables this company to produce several thousand more tires and tubes annually.

A flag raising was held last week at the Ajax plant. The Second Regiment band provided music for the occasion. A company of militia was present, and several thousand people assembled to witness the ceremony.

* * *

The Z. Z. Tire & Rubber Co. will shortly begin to do its own compounding. The company has hitherto had this done at one of the Trenton rubber mills.

* * *

The Globe Tire Co. has removed its executive offices from Trenton to 1851 Broadway, New York City. The billing and a large part of the correspondence will be done in the future from the New York headquarters. This concern recently completed a three-story addition, 50 by 200 feet, for making tires.

* * *

The James E. Thropp Sons' Co., maker of rubber machinery, has given contracts for the erection of an office building to cost $22,000. The building will be of tapestry brick and Indiana limestone. Fireproof vaults will be provided on each of the floors.

* * *

As a result of "Wire Your Home" campaign conducted by the

Trenton Electric Club, scores of Trenton homes are being wired for electricity. The campaign was successful far beyond the hopes of the club.

* * *

Work is progressing rapidly on the new plant of the Westinghouse Lamp Co. in North Trenton. The plant will cover several acres.

* * *

John A. Lambert, of the Acme Rubber Co., presided at a meeting held for the purpose of planning for the mobilization of Trenton's industrial establishments in view of war time needs.

THE RUBBER TRADE IN RHODE ISLAND.

By Our Regular Correspondent.

FOR many years the manufacture of rubber goods has been prominently identified with the industrial history of the State, but the past two years has materially increased its standing and it is now one of the six leading industries. Present indications point to still further expansion. Every plant is flooded with orders, many of them for immediate delivery; but the handicap of shortage of labor and the high cost of material are deterrent factors in necessary enlargements that would, under ordinary conditions, be made at once.

But the help proposition is not merely a local one, as the frequent advertisements in the want columns of the daily newspapers attest. These offer very alluring terms and conditions, which, however, have not proved sufficiently tempting to call any great number of operatives from the Rhode Island factories. One of the most recent calls has been from the Rubber Insulated Metals Corp., of Plainfield, N. J., for experienced tire makers, offering permanent employment at $4.50 to $5 a day. But local rubber concerns are also calling for additional operatives through the same mediums and there is no necessity for even an ordinary worker leaving Providence and vicinity for steady employment at good wages.

* * *

Maurice C. Smith, for several years assistant treasurer at the National India Rubber Co., Bristol, has been promoted to treasurer to succeed A. H. Emerson, who has become sales manager of the company's insulated wire department.

Alvin M. Bullock, who has been employed at the factory of the National India Rubber Co. for the past 20 years, during 18 of which he has worked in the outsole cutting department, has severed his connection with the company. During the latter period Mr. Bullock estimates that he has cut out more than six million pairs of outsoles. His associates presented to him a handsome gold monogram ring.

* * *

The employes of the Crocker System Rubber stores, of which the Hope Rubber Co., of Providence, and the Newport Rubber Co., of Newport, are a part, tendered a reception and dinner to Isaac Crocker, of Providence, at the Narragansett Hotel, that city, in honor of his sixtieth birthday on Easter Sunday. The occasion was devoid of all formality, although everyone present was called upon by the toastmaster, Henry J. Callahan, manager of the Salem store. To Mr. Crocker was presented a handsome silver loving cup by his employes, and during the festivities Charles P. Lanning ("Lan"), the famous cartoonist, drew character sketches. The Crocker System Stores represented on this occasion included Hope Rubber Co., Providence, Rhode Island; Worcester Rubber Co., Worcester, Massachusetts; Lawrence Rubber Co., Lawrence, Massachusetts; The Crocker Rubber Co., Brockton, Massachusetts; Granite State Rubber Co., Manchester, New Hampshire; Salem Rubber Co., Salem, Massachusetts; Haverhill Rubber Co., Haverhill, Massachusetts; Newport Rubber Co., Newport, Rhode Island, and Fitchburg Rubber Co., Fitchburg, Massachusetts.

* * *

Patriotism is manifesting itself throughout this State as never before, and the employes of manufacturing plants of all kinds are vying with each other in the display of flags and the holding of patriotic exercises at the ceremonial raising. The various plants representing the rubber industry are among the establishments that have placed themselves on record. At the National India Rubber Co., Bristol, not only have large flags been placed in the several departments, but several hundred of the operatives have joined the Red Cross. On one day, recently, eight large flags were unfurled at the factory, six in the stitching room and two in the shoe room. Officers of the company were present and appropriate exercises were held in each room. Addresses were made and all joined in singing patriotic songs.

The employes of the Revere Rubber Co. held their flag raising on Patriot's Day, April 19, more than 1,000 of the employes being present at the celebration, each being presented with an American flag pin. The program included a medley of patriotic selections by an orchestra composed of employes and a very interesting address by W. T. Mead, dressed in Colonial costume, on the history of the American flag. At the conclusion of Mr. Mead's address bugle calls were sounded and "The Star Spangled Banner" was sung as the flag was unfurled. A salute was then given the flag together with a pledge of allegiance and the singing of "America."

* * *

Terence McCarthy, owner of the Narragansett Rubber Co., Bristol, who has been at St. Joseph's Hospital, Providence, for several weeks, returned to his home in Bristol about the middle of the month. He has been suffering from a complication of nervous troubles.

A new smoke-stack, 65 feet in height, has been erected at the main boiler room of the Narragansett Rubber Co.'s factory to replace the one blown down during a gale a few weeks previously.

* * *

A dozen or more young women fainted from excitement and fear early on the afternoon of April 5, as they were making their escape from the glove room of the Revere Rubber Co.'s plant on Valley street, after a bottle of strong acid had fallen to the floor in the chemists' room adjoining. They were taken to the factory hospital where they were treated. A fire was caused when the acid from the broken bottle mixed with other acids, and the flames spread rapidly, although they were soon extinguished. The damage did not exceed $500.

* * *

The Empire Auto Supply Co., 86 Empire street, Providence, is owned and conducted by Maurice Greenwald, 611 West 127th street, New York City, and Edgar E. Cohn, Winchester Hotel, Syracuse, New York, according to their statement filed at the local city clerk's office.

* * *

Charles H. Frucht has filed a statement with the city clerk of Providence that he is the owner of the O. K. Cycle Shop, 371 South Main street.

* * *

The trade certificate of the Smith Webbing Co., doing business in West avenue, Pawtucket, was filed recently with the city clerk's office in that city. The name signed as sole owner is Everlastik, Inc., 52 Chauncey street, Boston.

* * *

Fourteen concerns submitted bids for 3,000 feet of fire hose, and contracts have been awarded by the Woonsocket City Council committee on fire department as follows: C. H. Darling Co., Woonsocket, 500 feet of Grey King brand, 90 cents a foot; Combination Ladder Co., Providence, 500 feet safety fire department wax and para gum-treated hose, 90 cents; Eureka Fire Hose Co., Boston, 1,000 feet at 67½ cents.

* * *

The New England Tire Co., 144 Fountain street, Providence, is being conducted by Victor P. Hendrick, 181 Magnolia street, Auburn, according to statement filed at the city clerk's office.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

THE somewhat panicky buying of rubber during the latter half of February did not go far in raising prices, which remain at much the pre-war level in contradistinction to most other raw materials of industry. Of course, if the largely increased output promised from the Eastern plantations for 1916 had not matured, no doubt we should have seen much higher prices owing to the war demand. As it is, this had neutralized the loss of the Central Empire's market and prevented what many predicted for 1917, viz., a slump in prices owing to over-production.

Outside government work it cannot be said that trade is very brisk and among exporters especially there is a feeling that a very quiet time is ahead. With the practical cessation of pleasure motoring the tire branch is, of course, greatly affected. A good deal of export trade, especially with Scandinavia, is much hampered by the lack of shipping facilities.

"RUBASTIC" AND RUBBER.

The legal case in which the late manager of the "Rubastic" works sought damages for dismissal, resulted in a verdict for the defendants, the directors of the concern. It was given in evidence for the defense that "Rubastic," which was supposed to be a non-rubber substance of substantial merit, really owed its merits to an admixture of rubber. This may or may not have been a fact, as the plaintiff denied this, but whether or no, the case calls to mind more than one proprietary non-rubber article which has made a fleeting appearance on the market in the past and, in which, when a legal case was the sequel to a dispute, it was shown that what merit the material possessed was due to a judicious admixture of the old established body, rubber. It is quite possible that "Rubastic" does not contain rubber as ordinarily made, but that its properties can be so improved by an addition of rubber that a super "Rubastic" has been made containing a proportion of rubber. The rather delicate question then arises as to how it ought to be designated. Goods which contain no more than ten per cent of rubber and a lot of substitute are regularly sold as rubber goods without any outcry being heard, though one of these days it may be enacted that the title shall be that of the major and not the minor constituent.

A FORERUNNER OF FUTURE LABOR PROBLEMS.

There have been many prophecies to the effect that most if not all of the belligerent countries are in for labor troubles after the war, mainly because of the disinclination of workers to take more normal wages than those which have been paid in the rush and stress of war goods production. The rubber trade has already had its beginning without waiting for the termination of hostilities. In a Northern police court a waterproofing firm claimed damages from some men who left without giving due notice upon being put on ordinary work because the government work at which they could earn more money had come to an end. It was stated, incidentally, that boys were earning up to $8 per week. The case was decided in the manufacturer's favor.

WATERPROOFING INDUSTRY SCHEDULED BY THE GOVERNMENT.

The rubber manufacture, as also the waterproofing of material with non-rubber substances, have been scheduled by the Government as businesses of primary importance. This means that man power may not be compulsorily withdrawn so as vitally to affect the carrying on of any works, and also that new hands may be engaged as and when required. In the case of non-essential industries this cannot be done. Naturally there are many differing opinions among individuals as to whether particular trades are or are not essential. Even in rubber manufacture it would be difficult to prove that all the output is essential.

EAST AFRICA PLANTATIONS.

At a recent meeting of the East Africa Rubber Plantation, Inc., with the Tewa Rubber Estates, Limited, the Kamna Rubber Estates, Limited, and the Muhesa Rubber Plantation, Inc., for the purpose of considering the policy to be pursued in the immediate future in what was formerly German East Africa, it was decided to amalgamate at the first opportunity. There is to be an independent valuation of the assets of each company and in the meanwhile the companies are to work together so as to effect the greatest economies in administration. The fact that in the last year the East Africa Rubber Plantation, Inc., expended only £50 shows that there is not much prodigality to subjugate.

THE RUBBERINE COMPANY, LIMITED.

At the annual meeting of this company it was announced that Edward Taffen had been appointed chairman in place of the Hon. A. R. S. Douglas, who is on active service. A. T. Marks, the manager, has been appointed managing director. A ten per cent dividend was declared. This progressive company, which has been located at Hornsey, London, has now practically completed a new works at Market Road, London, N.

MOTOR TRUCK RIDES FOR SOLDIER CONVALESCENTS.

A frequent sight in many of the large cities is a truck load of sick and wounded soldiers out for an airing. It has come to be a common practice for many business houses to loan their trucks or automobiles for such purposes. A happy party of this kind is shown in the motor-lorry loaned by the London Goodyear company.

WOUNDED BRITISH SOLDIERS TAKING AN OUTING.

THE INDIA RUBBER MANUFACTURERS' ASSOCIATION, INC.

Among the many changes which the war has brought about is a disposition on the part of manufacturers in various branches of industry to form combinations of individuals and firms so as to act collectively and to greater effect in matters affecting trade interests generally. This movement has embraced the chemical, iron and steel, pottery trades, etc., and now the rubber trade has come more or less into line by the incorporation of the above-

named association. It is limited by guarantee without any share capital and the membership is limited to 100, each liable for £1 in the event of winding up. Membership is confined to bona fide rubber manufacturers having their chief works in the United Kingdom. The first members of the Committee of Management are mainly those last elected to the committee of the late association, viz.: J. T. Goudie, Leyland & Birmingham Rubber Co., Leyland; Peter Bate, general manager, Castle Rubber Co., Warrington; P. A. Birley, Chas. Macintosh & Co., Inc., Manchester; F. H. C. Brooking, general manager, St. Helens Cable & Rubber Co., Warrington; Richard Eccles, general manager, F. Reddaway & Co., Manchester; James Henderson, Ancoats Vale Rubber Co., Inc., Manchester; David Moseley, David Mosely & Son, Inc., Manchester; James Tinto, Truell & Eastern Rubber Co., Inc., Manchester; F. Webster, Avon Rubber Co., Manchester.

A considerable accession of membership is reported during the last year or two and arrangements are being made to establish sectional committees in London and Glasgow. Among the many objects which the association has in view are the consideration of the terms and clauses in specifications issued by government departments and various public bodies; the encouragement of inventions likely to be of general utility to the trade; the encouragment of fresh sources of supply, of other necessary raw materials and the obtaining of adequate representation of the industry on trade boards.

WILKS BROTHERS WORKS ENLARGED.

Messrs. Wilks Brothers have almost completed the large extension to their premises at Booth street, Blackfriars, Manchester. Since the disastrous fire of 1913 the original premises were rebuilt with an additional story, but further extensions were subsequently necessitated. The firm manufactures waterproofs, rainproofs and oilskins, for the last of which the late S. Carter Bell had an agency in America where goods of this class do not seem to be so well known and popular as they are in Great Britain. Messrs. Wilks do a large business in motorcycle suits. In weatherproof cloth they have a specialty in their Aquarepel.

PERSONAL MENTION.

I record with regret the death of Colonel Herbert Hughes, of Sheffield, early in the year. The deceased, who was well known to a good many business people in America, was primarily connected with the steel trade but on the formation of the Xyler Rubber Co., Inc., of Manchester, four years ago he became one of the directors.

G. W. Leeson, who has been connected with the rubber heel manufacture in Manchester for some years, has now gone to London in connection with the Leeson Sponge & Rubber Co., Limited, of New Enterprise Works, Chiswick Road, London, W. Apropos of the rubber sponge I may say that retail prices of the American article have shown a sagging tendency, as general dealers are now competing with druggists in sales to the public.

William Somerville's Sons Rubber Co., Limited, is now the title of the Liverpool firm so long known in the reclaimed rubber trade as William Somerville's Sons. F. R. Burrows is the manager of the new company, having been associated with the business for many years. One does not hear anything of Mitchell's rubber nowadays, but those whose memory goes back 30 years or so when brands of reclaimed rubber were not so numerous in this country as they are to-day, will remember the time when Mitchell's rubber, as sold by Somerville's Sons, was a synonym for reclaimed rubber. Mr. Mitchell, of course, was an American who afterwards acquired an interest in Somerville's Sons.

A. Staines Manders, manager of the International Rubber and Allied Trades Exhibition, Limited, and Miss D. Fulton, secretary of the same corporation, are sending out a notice of the removal of their offices to Brownlow House, 51 High Holburn, London, W. C., which is also the headquarters of the Fulton-Manders Publishing Co., and the International Press Publicity Bureau.

THE RUBBER TRADE IN HOLLAND.

By a Special Correspondent.

THE Netherlands Ovearseas Trust has entered upon an agreement with rubber importers, which has caused great indignation among rubber manufacturers. By this agreement, the importers are to place at disposal for sale 300 tons of rubber, at 2.50 florins per half kilo [$1.00 per 1.1 pounds], consisting of 75 per cent of prime and 25 per cent inferior qualities. The new regulation, ostensibly in the interests of manufacturers, further provides that the Trust shall decide whether applications are to be granted at all, the quantity to be allowed each applicant and the importer from whom rubber can be obtained. The whole quantity of rubber that has been allotted a certain manufacturer must be taken by February 1, 1918, and should delivery take place later, he will be charged interest at the rate of 5 per cent per annum and 50 cents per case per month warehouse fees and fire insurance premium.

The chief objections to this arrangement are that manufacturers are obliged to accept rubber which may or may not meet their requirements, the charges for storage and interest, and the high price of the rubber itself. To add to all this, the feeling exists that the measure was absolutely unnecessary, as manufacturers have never complained of any unwillingness on the part of the importers to release rubber for consumption.

A COURSE IN INDOLOGY.

What is expected to be of great benefit to the Dutch East Indies is the inauguration of a course in Indology by the board of directors of the Colonial Institute at Amsterdam. The object is to give suitable training for work, agricultural and otherwise, to those contemplating emigrating to the Dutch East Indies. The course will be held twice a year in Amsterdam, and the following subjects will be treated:

1. Essentials of the ethnology of the Indian Archipelago.
2. Introduction to the geography of the Dutch East Indies, with special regard to agriculture, mining, commerce and traffic.
3. Elements of the Malayan language.
4. Essentials of social conditions in the colonies.
5. The public institutions in the Dutch East Indies, with special regard to agrarian and labor laws.

In addition to these, quarterly courses will be given in:

a. Tropical hygiene, diseases, personal hygiene and sanitation (especially on big plantations).

b. Colonial products.

c. If necessary, lectures on other colonial topics will be held.

It is expected that this course, which commenced March 2, will not only promote the actual knowledge of economic conditions in the colonies, but also a proper understanding, and thus better cooperation between the European and the Oriental in the Dutch Indies.

EMBARGO ON AUTOMOBILES.

The Netherlands Government has declared an embargo on automobiles. All shipping space has been requisitioned for foodstuffs and automobiles and other luxuries will not be accepted for shipment for some time.

DR. ITERSON RETIRES.

A royal decree to go into action November 1, has honorably discharged Dr. G. van Iterson, Jr., of the Technische Hoogeschool (Technical Academy), Delft, Holland, from his duties as director and supervisor of the Ryksvoorlichtingsdienst (Government's Information Service), in behalf of the rubber industry, and nominated him advisor to the same institution. Dr. A. van Rassun, now assistant, has been nominated director in his stead.

FIRST NETHERLANDS ANNUAL INDUSTRIAL FAIR.

On February 24, 1917, the official opening of the First Netherlands Annual Industrial Fair at Utrecht, took place, the Queen being the patroness. Of the 668 participants, 35 represented the leather and rubber industries. Owing to the war, there were no foreign visitors. Nevertheless, the enterprise has been declared a success and will be held in the spring of 1918.

INFANTS' NIPPLES IN FRANCE.

The French law of April 6, 1910, prohibiting the sale and importation into France of certain tube feeding bottles has been extended so that it now also covers infants' "comforters" and nipples made of materials other than pure rubber, vulcanized by a process other than hot vulcanization, and not bearing, besides the manufacturers' or traders' mark, the special indication "caoutchouc pur."

AN EXCHANGE TO PROMOTE RUSSIAN-AMERICAN TRADE.

The newly established Russo-American Merchants and Manufacturers Exchange, Inc., with headquarters at 120 Broadway, New York City, aims to bring American producers and Russian consumers together, to familiarize each with the business methods of the other, and to establish a common ground for trade exchanges. The campaign among Russian consumers will take the form of a comprehensive directory of American industries in the Russian language, and which will be distributed throughout Russia to the number of 40,000 copies

DENMARK PROHIBITS AUTOMOBILING.

The effect of the strict British censorship on all shipments of cars, gasoline and tires is being keenly felt in Denmark. Prices for gasoline are four to six times as high as in the United States, while few tires reach there. Under these circumstances, the Danish Government has thought it advisable to prohibit temporarily the use of passenger cars on the streets.

GERMANY WANTS BRAZILIAN RUBBER.

It would appear that Germany's difficulties in obtaining rubber will not be greatly diminished after the war. True, she intends to establish a rubber market for Central Europe at Hamburg when peace is restored. But, for a time, at least, she will hardly be able to import rubber from the British colonies, and Brazilian exporters are of opinion that a rubber market must be created in France. They think it absolutely necessary to establish in France a free port and a banking organization capable of freeing the Brazilian exporter and the French consumer from the monopoly exercised by the port of Hamburg until 1914.

CORKS FOR BICYCLE TIRES IN GERMANY.

Meanwhile, German ingenuity is being taxed to the utmost to find means by which the deficiency in rubber articles can be supplied, and experiments are being made with all kinds of substitutes.

According to the German paper, bicycles have become almost extinct in Germany since the seizure of rubber tires. Corks from wine bottles provide a substitute, however, about 100 being needed for both wheels at a cost of 2 to 3 marks. The corks should be of equal breadth, not tapering sharply, four to five centimeters long and about 23 thick. They are pressed tightly together and cemented to the rims of the wheels. Cork is very elastic, and although it has not the resilience of rubber, especially on rough pavements, when traveling on good roads it is quite satisfactory.

RUBBER MACHINERY DUTY FREE IN CEYLON.

A recent change in the tariff laws of Ceylon exempts from duty machinery intended for use in the manufacture of articles from crude rubber.

BRITISH INDIA.

The new tariff (No. 121) on rubber tires for motors and motorcycles, and rubber tubes for tires and other manufactures of rubber, not otherwise specified, is now 7½ per cent ad valorem.

Welfare work is on the increase in the Far East. The Bandar Rubber Co., of Sumatra, has appropriated a goodly sum for a vacation beach resort on Toba Lake for the benefit of its employes.

RUBBER TRADE IN HANKOW, CHINA.

HANKOW is an important city in northeast China, from which are exported hides, skins, silk, tea, cotton, nuts and other products of the soil. There are about 70 firms which do an export and import business. The following information, of interest to rubber manufacturers, is furnished THE INDIA RUBBER WORLD by Edwin S. Cunningham, Consul General, at that city:

At the present time rubber belting in 1 inch to 6 inch widths, rubber hose in 1 inch to 2½ inches diameters for steam and water fittings, and rubber packing in sheet form are the chief rubber articles imported into this district. The various jinrikisha firms also handle rubber tires, and some small amounts of rubber goods are carried in stock by the local motor car and accessory dealers and by the drug and druggists' supply houses.

According to statistics issued by the Chinese Maritime Customs, rubber and rubber goods were imported into Hankow to the value of $7,918 (gold) during 1914; $19,263 during 1915, and $11,276 during 1916. Japan furnishes the bulk of these goods, with Russia second, Great Britain third, France fourth, Hongkong fifth, and the United States sixth. Tientsin acts as the chief market in China for rubber goods, with Manchouli second, Shanghai third, Dairen fourth, and Hankow fifth.

Rubber belting is not included in the above figures, as it is classed with the other varieties of belting. According to the Custom House statistics there was 93,460 taels [$77,412 U. S. currency] worth of machine belting imported into Hankow during 1916, of which, according to the commissioner, 80 per cent is of leather. The bulk of the remaining 20 per cent is made up of rubber and woven belting, but in what proportions I am unable to say.

Local dealers report that due to the climate of Hankow, which has a very deleterious effect on rubber articles, they prefer to buy their goods from Shanghai distributers and thus avoid the risk of keeping large stocks on hand which might be spoiled by the weather.

In consequence it would appear that the greatest opportunity for supplying the rubber market of this district lies in forming connections with some of the large importing houses of Shanghai, as that port acts as the chief distributing point for practically all of central China.

It might be advantageous for manufacturers of rubber goods desirous of entering this market to communicate directly with the various Hankow firms handling rubber goods, in which case the following list of local dealers will be found valuable for reference. To avoid repetition, American addresses are given in the numbered footnotes below:

BELTING. Anderson, Meyer & Co., Limited[1]; Burtenshaw & Co.; A. Brandt & Co.; Carlowitz & Co.[2]; H. Deiderichsen & Co.[3]; Robert Dollar Co.[4]; Lothar, Marcks & Bush*; New Engine & Iron Works; F. Schwartzkopf & Co.; Westphal, King & Ramsay, Limited[5]; Chinese American Co.[6]; Neilsen & Winter China Engineering Co.

HOSE AND FITTINGS. Anderson, Meyer & Co., Limited[1]; Burtenshaw & Co.; A. Brandt & Co.; Carlowitz & Co.[2]; H. Deiderichsen & Co.[3]; F. Schwarzkopf & Co.; Telge & Schroeter[7]; Neilsen & Winter China Engineering Co.

TIRES AND ACCESSORIES. (See also Jinrikishas, below). Arnhold, Karberg & Co.[8]; A. Brandt & Co.; H. Deiderichsen & Co.[3]; New Engine & Iron Works; F. Schwartzkopf & Co.; Weeks & Co.[9]; L. S. Wureh & Co.; Central Garage Co., Limited.

JINRIKISHA DEALERS. Star Rickshaw Co.; F. Ramello; Hankow Rickshaw Syndicate; Fook Kee & Co.; Tong Chong Bicycle Co.

GENERAL RUBBER GOODS AND SUNDRIES. Arnhold, Karberg & Co.[8]; Hankow Dispensary, Limited[5]; New Engine & Iron Works; Pharmacie Centrale; F. Schwarzkopf & Co.; L. S. Wureh & Co.; Chinese American Co.[6].

American representatives or agents of these firms are:

1—Pacific Commercial Co., 50 Broad street, New York City.
2—Carlowitz & Co., 82 Beaver street, New York City.
3—Crossman & Sielcke, 90 Wall street, New York City.
4—Robert Dollar Co., 230 California street, San Francisco, California.
5—Irwin, Harrison & Crossfield, 90 Wall street, and G. Amsinck & Co., Hanover street, New York City.
6—Chinese American Co., 200 Devonshire street, Boston, Massachusetts.
7—H. Marquardt & Co., 35 South William street, New York City.
8—E. H. Erlinger, 60 Wall street, New York City.
9—Muller, McLean & Co., 11 Broadway, New York City.

* This firm imports only for its own needs in the sawmill business.

While these firms are all of good repute, the writer can accept no responsibility for them in any way. They can, do doubt, furnish references, and information as to their credit standing can be obtained from the local banks upon application by your bankers. Correspondence with them may be in English irrespective of their nationality

THE SITUATION IN JAPAN.

By a Special Correspondent.

THE demand for rubber goods in Japan and Far East localities supplied by Japan is increasing rapidly. Such representative men as Chugo Moriya, a large dealer in general rubber goods, and Yoshio Kawashima, manager of the Oriental Rubber Cloth Co., agree that the demand in 1915 was fully double that in 1914. This was particularly true of electrical goods, jar rings, packing, air-cushions and raincoats. The latter were more of cotton costing about $7.50 and less of silk than formerly, due perhaps to economies on account of the war. Exports to China and the South Sea islands showed a big increase.

RESTRICTIONS ON RUBBER EXPORTS.

Crude rubber and manufactured rubber goods imported from England and her colonies or elsewhere may not be exported from Japan except upon agreement with the British authorities. However, German agents in China, desiring to export such materials to neutral countries, found it convenient to ship them to our ports and place them in a bonded warehouse until a sailing to the desired port occurred. On January 27, however, a ruling of the Department of Agriculture and Commerce brought such goods into the prohibited list and presumably stopped this traffic. Unless the principle dictating the change be rigidly enforced, however, to prevent transfers in the offing or even on the pier but outside bonded warehouses, the efficacy of the new ruling is doubtful.

Although the Russian Government has purchased large quantities of rubber tires of Japanese manufacturers, the larger business in rubber toys and druggists' sundries has been lost through the Russian prohibition of all imports of luxury during the war.

RUBBER TOYS.

Japan has long been a great producer of toys, and it is not surprising that some of our rubber manufacturers should seek an outlet for their goods through similar channels. In the manufacture and sale of colored toy balloons Sadakichi Okuda, of Asakusa, takes the lead under the firm name of Sawadaya. Much of his product is sold abroad, the exports for March alone totaling 34,000 balloons valued at over $7,500. In Tokyo his wares are sold by street venders, toward whom he has shown great benevolence. As he is said to be worth $1,000,000, it has been possible for him to supply balloons to these poor men on extended credit which has enabled many of them to make a substantial start in mercantile life.

One of our leading manufacturers of rubber toys has recently placed on the market a novel globe bouncing ball with the various countries molded upon its surface. This, it is thought, will be pleasing as a plaything and instructive in geography as well.

JAPANESE PLANTATIONS IN MALAYA.

A noticeably better feeling is being manifested toward the Japanese in Malaya than hitherto. Those who first settled there, unfortunately, uneducated and without means, were held in contempt by both natives and white men, and it is not surprising that a like antipathy was felt toward the better classes of their countrymen who followed later. Government officials were regarded with suspicion, but when it was realized that legitimate business and not territorial ambition was the Japanese aim, and when our enterprise and progressiveness were observed, a friendly feeling began to develop which will make it possible for Japanese and British planters to cooperate for the good of the industry.

Since Mr. Akuzawa bought 300 acres on the Malay Peninsula in Johore in 1905, at a cost of $100,000, Japanese planting interests have grown until now the invested capital aggregates $7,000,000. Of the leased area, amounting to 110,000 acres, 50,000 acres are now planted and the 1916 production of rubber reached 2,230,000 pounds. The planted area is constantly increasing and will soon become 60,000 to 70,000 acres. Several plantations located on the west side of the Nafu River, about 80 miles from Singapore, are just reaching the tapping age. About 400 Japanese and 5,000 Chinese coolies are employed in this region.

An association of Japanese planters has been organized with a governing committee of 40 members representing each estate. Aside from activities directed toward expansion and general development, particular attention is being devoted to sanitary conditions and a well-equipped hospital on every estate. Cooperation, wherever possible, with British, Dutch and Chinese interests is one of the chief aims.

Our advantages as a people in rubber planting seem to outweigh our disadvantages. Of the former may be mentioned our ready adaptability to agricultural organization; the low cost of administration; our dependence upon rice as a principal food, which grows well, in the East Indies; the fact that we endure the tropical climate with ease, and that our Chinese and other laborers, being of similar race, trust us, despite slight differences in religion, manners and customs, so that superintendents and laborers work harmoniously together.

Our disadvantages lie in high interest charges on capital; the desire for quick successes and a tendency to be satisfied with small earnings; the absence of well-organized experimental and research work looking toward improved methods and product, and the lack of business combination and cooperative effort. Thus there is still much opportunity for constructive work for the common good of the industry.

RUBBER COMPANIES PROSPEROUS.

Toyojino Miyake, of the Nippon Rubber Co., reports a greatly increased business during 1915 in belts, balls and particularly automobile tires from the factory which was enlarged in September, 1915. The gross proceeds were over $146,500 and the profits $28,750, which were somewhat affected by the rising cost of raw materials. Medium quality tires of 26- and 28-inch size were in great demand. Balls were chiefly exported to China and Argentina. Some dolls were made, but only to special order.

The Settsu Rubber Co. earned profits of $5,181 for the past year.

The profits of the Chiyada Rubber Co., of Tokyo, were $11,347.

For the last six months of last year the Takasago Rubber Co. reported profits of $2,538.

TRADE NOTES.

On the 43,200 square feet of land recently purchased, the Kakuichi Rubber Co. is now erecting an extension to its former factory which will cover 25,200 square feet. Machinery and general equipment will be modern in every respect.

The Teikoku Rubber Co. has been reorganized as a joint stock company with a capital stock of $75,000 and will erect a new factory.

The Miyagawa Rubber Store has opened a foreign trade department at 34 Nichome, Yamatedon, Kobe, which will continue the export business of the firm and also engage in the importation of crude rubber, chemicals and other raw materials.

The Alenken Rubber Factory has purchased 14,400 feet of land adjoining its present site for immediate extension of the plant.

The building of the Kanae Packing Manufacturing Co. is nearly ready for occupancy at 601 Kitsu, Jomammamura, a suburb of Osaka. The output will consist of asbestos material, packing and rubber goods. Of the $250,000 capital stock, $62,500 has been paid in.

One of the leading spirits in the development of the Japanese rubber industry is Kenjiro Tsuji, managing director of the Chiyoda Rubber Co., who is bending his energies not only to his own firm's welfare, but to the rubber interests of the whole country as well.

The rubber industry of Osaka now comprises 58 factories em-

ploying 416 men and 355 women. Both the Hirando Rubber Manufacturing Co. and the Ogata Rubber Store, of Osaka, have recently completed additions to their factories. The latter includes the best modern equipment for the manufacture of overshoes and rubber heels.

Several new stockholders have increased the working capital of the Taiheigo Rubber Co. to $6,000.

At the general meeting of the Asaki Rubber Co., a $150,000 plantation firm, it was announced that its trees, valued at about $116,000, are about to come into bearing.

A rubber horseshoe said to have three times the durabiliy of an iron horseshoe has been patented by Gentaro Yameguchi.

The Taigo Rubber Co., 17 Kayabadio, Honjoku, has been reorganized with a capital of $50,000 for manufacturing and selling rubber goods.

TAPPING METHODS.

AN interesting article, contributed by F. M. Riley to the "Planters' Chronicle," explains the various tapping methods employed by planters in Malaysia. He enumerates the four now employed on European-managed estates as follows:

A. Basal V
B. One cut one quarter
C. Two cuts one quarter (same quarter)
D. One third

The first mentioned (A) Basal V, is mostly employed on newly opening up, where a fairly large return per acre is desired.

(B). The one cut one quarter is chiefly employed on old trees, say 10 or 12 years old, where the preservation of the bark has become of vital importance.

DAILY TAPPING RECOMMENDED FOR ONE QUARTER CUTS.

(C). Two cuts one quarter (same quarter) are used when the tapping in the past has not been so drastic and the conservation of the bark not of such vital importance. Generally on old trees, the cuts can be 2 feet to 2 feet 6 inches apart, according to size of the trees. Alternate day tapping is strongly advised for this system.

THE ONE-THIRD METHOD CONSIDERED BEST.

(D). This, the one-third method, is the last referred to, and is considered the most important of all. It is a comparatively new practice and has stood all tests well. Under this system the amount of bark consumed is 17 per cent less than the Basal V, while the amount of latex differs only slightly, on some estates practically not at all, and on others not more than 10 per cent less. The exception is on young trees, and this is an advantage, as the Basal V for young trees is considered too severe a treatment, removing too much latex. It is possible that the one-third method may be adopted on the system of daily tapping, and come into general use both for old and young trees.

Great differences in estates are noted, especially in respect to soil, moisture, etc., and those exposed to the sea air are reported as not giving such good results as those located inland.

TAPPING KNIVES.

Regarding tapping knives it appears several kinds are in use and recommended, but the great art of good tapping is a sharp knife, and most coolies take two knives with them to the field, cutting half the job with one, and half with the other, the knives being resharpened at night by a professional, who gets about 50 cents per man per month, this being paid by the coolies.

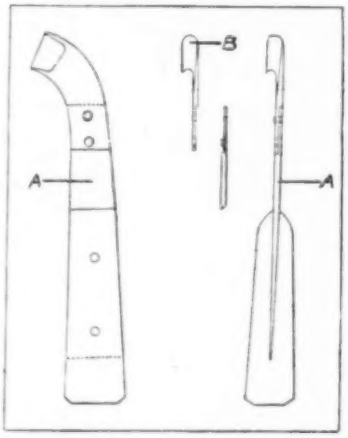
This applies only to the Chinese, however, who are better paid than the Tamils. The latter sharpen their own knives. One of the duties of the assistant should be to test the coolies' knives at least 2 or 3 times weekly.

PERUVIAN EXPORT DUTIES.

The Peruvian government has imposed a duty of 2 centavos per kilogram of rubber exported through Iquitos, and a tax of 20 centavos per registered ton on ships clearing from that port.

NOVEL TAPPING KNIFE AND LATEX SPOUT.

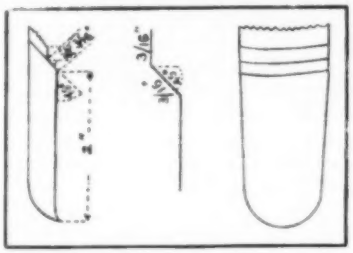
THE tapping knife here shown presents many practical features of construction, and the fact that it has been in use for some time on a large estate in the Far East lends interest to the device. A simple, fool-proof knife has been the object of tapping tool inventors, who have consistently endeavored to improve this most necessary plantation accessory.



As the cutting edge wears away in a comparatively short time, a replaceable, one-piece blade is necessary, and one that may not be loosened and its position changed at will by the tapper. Referring to the drawings the fixed blade *A* is provided with a dowel pin, and a rivet hole at its upper end is attached to an ordinary wooden or metal handle. The loose blade *B* has two holes at its lower end for the dowel pin and rivet, by which it is attached to the fixed blade. The head of this rivet must be filed off when it becomes necessary to attach a new blade. The handle should, with ordinary use, outwear four or five blades.

AN IMPROVED SPOUT.

The ordinary latex spout is usually defective in that it may be driven too far into the tree, thereby causing a woody excrescence when the wound heals over. The spout here shown is constructed with a shoulder that prevents this difficulty. The shoulder slopes downward at an angle of 45 degrees and has a depth of 3/16 of an inch. It is desirable that the end of the spout should be curved, and the correct depth should depend on the diameter of the tree, the angle at which it is placed and the general curve of the spout. When the depth of the attaching end curve is correct it will always enter the bark at the same depth and remain firmly in a correct position.



The tapping tool was designed by A. Bailey and the latex spout by Donald Knapp, both of the General Rubber Company, Sumatra.

LEAF-FALL INVESTIGATION IN MALANG.

Investigations to discover the causes of abnormal leaf fall from *Hevea* trees have been made at the experiment station at Malang, but with no very definite results. In most cases heavy rains prevailed just before such leaf fall occurred. In some instances parasitic fungi have been found on the leaves. In Malang the fungus *Neozimmermannia elasticae Kds.* (*Gloeosporium elasticae Massee*) has been found in two cases of abnormal fall of young leaves, but artificial infection with pure cultures of this fungus has thus far given no definite result.

Dr. Arens advises that fallen leaves should be gathered at once and burned on the spot. If possible the affected trees and those nearby should be treated with fungicide. Trees thus treated should not be tapped, as they might produce tacky rubber because of the use of the fungicide.

Rubber Planting Notes.

RUBBER PRODUCTION IN SOUTH INDIA.

ACCORDING to Lucien Memminger, American Consul at Madras, India, the ten principal rubber plantations of South India produced over 3½ million pounds of rubber last year. A study of the detailed report showing the crops harvested in 1915 and 1916, and the estimates for 1916, indicates that in each case the 1916 yield was considerably above that of 1915; that on most estates the estimate has been considerably exceeded; that the Rani Travancore Co., which up to the end of 1915 was the largest rubber producing company in Southern India has now been displaced by the Malayalam Rubber Produce Co. With prices nearly approaching the average of 1915 and lower costs of production in most cases, some very substantial dividends may be expected. In this respect so far the Pudukad and Cochin companies are leading with interim dividends aggregating 40 per cent and 30 per cent, respectively.

RUBBER PLANTING IN SIAM.

Up to the present the rubber exports from Siam have not been very significant. On the only rubber plantation of importance in southern Siam 25,000 trees were planted about 6 years ago. Of these 20,000 are now ready for tapping. Considerable quantities of rubber are said to come from northern Siam, however. In the districts of Trang and Setul, Siamese Malay States, some attention is being given to rubber planting, but as far as can be ascertained, the production has, until now, been of little importance.

WEEKLY AUCTIONS AT MEDAN.

The Medan Produce Trade Association has decided to arrange to hold rubber auction sales weekly, instead of fortnightly, as is now the case. These sales may be private or public, according to the wishes of the sellers. Only members of the association will be permitted to take part in these sales, whether public or private.

A DEFECT COMMON IN SHEET RUBBER.

Sheet rubber frequently shows a dark line near and parallel to the edges. The cause of this has been investigated by Dr. P. Arens, who explains the cause as follows:

The cause of this line is a very simple one. The strength of the rubber, coagulated in the pans, is not the same in every part. The surface, which is exposed to the air, especially near the edges, is somewhat stronger than the rest.

When the sheet is rolled and insufficient precautions taken, this surface is less stretched than the other parts of the coagulum, with the result that the latter protrudes beyond the original margin of the sheet. This original margin retains its position a certain distance inside the newly formed edge and, since it was the hardest part of the coagulated mass, it is not so compressible as the rest and therefore forms a distinct ridge.

To avoid this, certain measures have to be taken, when putting the sheet through the rollers. The sheet must pass through the rollers in the same position it had in the coagulating pan, *i. e.*, the upper surface in the latter kept uppermost when put in the rollers. The sheet should be gripped by the rollers in the middle of the small side first, so that the edges pass through the rollers somewhat later than the middle. The edges must be turned down a little, whilst the sheet is passing through the rollers. If this is done, the margin of the sheet, hardened in the coagulating pan, will also form the margin of the sheet after rolling, and therefore no prominent line will be visible.

It is advisable not to fill the pans too full, as the prominent line will be more easily formed on a thick sheet than on a thin one.

A good material on which to train the coolies for this work is sheets the surface of which is darkened by oxidation in the coagulating pans. If these sheets are rolled in the proper manner, no white margin should be visible after rolling.

BELGIAN CONGO PROSPEROUS.

Despite the conditions imposed by the war, Belgian Congo prospers. The Governor General of the colony is reported to have said that the revenue is expected to show a surplus of 8,000,000 francs over the estimates in the current budget.

The figures for the rubber exports show a slight decline, 4,428,945 pounds in 1915 as against 4,892,166 pounds in 1914, but the increase in the price of rubber is again drawing the attention of buyers to the Congo product, the value of which had depreciated in 1914.

INCREASES IN THE GOLD COAST TRADE.

Figures for the trade of the Gold Coast show a decided increase, not so much in the quantities imported and exported, as in the values. The imports for the year 1915 amounted to £3,116,686, that is, 1 per cent less than in 1914, while the exports for 1915 were £5,814,810, or 30 per cent more than in 1914. The increased prices in all goods are largely responsible for these high figures and the profits are said to have been enormous.

The exports of rubber for 1915 were 647,982 pounds, valued at £25,167, as against 654,133 pounds valued at £21,631 in 1914, furnish a very fair illustration of the truth of the above.

GERMAN EAST AFRICA REOPENED FOR FOREIGN COMMERCE.

Communication with German East Africa is being gradually reestablished. The British Postmaster General has also announced the establishment of a parcel post service to the southern portion of German East Africa. All ships engaged in foreign commerce must clear at either Tanga or Dar-es-Salaam, on license of the British customs authorities.

PLANTATION RUBBER IN BRITISH GUIANA.

The Department of Science and Agriculture reports the area of rubber under cultivation for the year 1915 as being 4,687 acres, a decrease of 275 acres as compared with returns for 1914. This is due to the throwing out of areas planted with sapium rubber, as well as the abandonment of some small areas of Para rubber, the soils having proved unsuited for its cultivation.

Experimental tapping was continued at the Issorora and Onderneeming stations and for part of the year at Christianburg.

At Issorora the crop for the 12 months ending January, 1916, was 1,000 pounds of dry rubber (854 pounds biscuit and 146 pounds of other grades), obtained from 428 trees of from 5 to 7 years old, an average of over 2¼ pounds of dry rubber per tree.

In one experiment 300 trees, tapped by a man and a boy, yielded 873 pounds of dry rubber, which cost $58.40 to collect, or less than 7 cents per pound. Most of the produce was sold in London in February, 1916, at a price of 81 cents per pound for biscuit and 68 cents per pound for scrap and other lower grades.

The latex of the other 128 trees was mainly used for the preparation of "ball" rubber by smoked coagulation, similar to the Brazilian method.

At Onderneeming the crop was 310 pounds of dry rubber (257 pounds biscuit and 53 pounds scrap, etc.). Part of this was sold in February, 1916, at 81 cents for biscuit and 68 cents for scrap.

At Christianburg 128 trees were tapped. One year's tapping yielded 201 pounds of dry rubber (161 pounds biscuit and 40 pounds scrap, etc.). A part sold in September, 1915, brought 56 cents per pound; the remainder realized in February, 1916, 81 cents for biscuit and 58 cents for scrap.

The results obtained at the experiment stations were, therefore, highly satisfactory. The same is said of the returns for 1916; the yields from the trees are very good and brought the highest prices.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED MARCH 20, 1917.

NO. 1,219,420. Cord tire. C. L. Archer, Minneapolis, Minn.
1,219,502. Water bag. E. J. Straus, St. Louis, Mo.
1,219,577. Rubber patch for pneumatic tires. J. G. Moomy, Erie, Pa.

1,219,653. Cushion tire. Ida I. McLeod, Lakeland, Fla.
1,219,675. Fountain pen. O. Shackelford, Fairmont, W. Va.
1,219,729. Valve stem gage with rubber tube. G. T. Hackley, Los Angeles, Calif. S. C. Hackley, administratrix of said G. T. Hackley, deceased.
1,219,798. Wheel rim. O. H. Bartholomew, assignor of one-half to J. Halbrohr—both of Peoria, Ill.
1,219,865. Tire gage. A. E. Pollock, Chicago, Ill.
1,219,925. Automatic tire valve. F. A. Dean and W. H. Little, Alta Vista, Kans.
1,219,948. Rim tool. G. A. E. Kaehler, Fresno, Calif.
1,219,991. Rubber heel. F. A. Nolan, St. Paul, Minn.
1,220,004. Collapsible rim. F. Rogers, Galveston, Tex.
1,220,006. Closure for rubber receptacles. T. Rowe, Leytonstone, England.
1,220,107. Tire tool. A. C. Hartman, Dillsburg, Pa.

ISSUED MARCH 27, 1917.

1,220,172. Teat cup. A. L. Berthelsen, Chicago, Ill.
1,220,272. Tire gage. A. E. Pollock, assignor to Firex Manufacturing Co.—both of Chicago, Ill.
1,220,282. Eraser. J. C. Smith, Kansas City, Mo.
1,220,321. Device for expanding and contracting demountable rims. C. F. Corbett, Clear Springs, Md.
1,220,372. Waterproof elastic fabric. A. C. Squires, assignor of one-half to John E. Wainwright—both of College Point, N. Y.
1,220,471. Demountable rim. F. Spranger and N. M. Spranger, assignors to Spranger Rim and Wheel Co., a corporation of Detroit—all of Detroit, Mich.
1,220,516. Segmental vehicle-tire. P. E. King and G. J. Wittmann—both of Newburgh, N. Y.
1,220,541. Demountable rim. A. J. Park, Madison, Wis.
1,220,568. Inner tube protector for pneumatic tires. G. Starke, New York City.
1,220,603. Storage battery construction comprising a hard rubber part. D. J. Cartwright, South Bethlehem, Pa.
1,220,625. Life-saving suit. J. Grudzienski, Toledo, Ohio.
1,220,653. Auto tire. G. Loffi, assignor of forty-five one-hundredths to F. E. Fluke—both of Garrett, Ind.
1,220,659. Tire tool. C. B. Mansbach, assignor of one-third to F. L. Price, and one-third to F. A. Carlson—all of Brockton, Mass.
1,220,660. Composite heel. C. B. Mansbach, assignor of one-half to F. L. Price—both of Brockton, Mass.
1,220,661. Fire hose. R. Many, Oak Park, Ill.
1,220,724. Vulcanite arch support. A. A. S. Burns, Montreal, Quebec, Canada.
1,220,750. Sunshade for pneumatic tires. R. C. Jeboult, Edmonds, British Columbia, Canada.
1,220,809. Dust cap for valve stems. E. L. Aitken, Springfield, Mass.
1,220,819. Tire patch clamp. H. Bretthauer, New York City.
1,220,867. Pressure indicator for tires. Lauchlin McInnis and David B. Semon—both of St. Paul, N. C.
1,220,874. Toy balloon. T. W. Miller, assignor to The Faultless Rubber Co.—both of Ashland, Ohio.
1,220,875. Fountain pen. M. W. Moore, Somerville, assignor to Samuel Ward Manufacturing Co., Boston—both in Massachusetts.
1,220,914. Puncture proof pneumatic tire. R. Wapshare, Westward Ho, Bangalur, British India.
1,220,925. Hose supporter. Ann E. Zabriskie, New York City.
1,220,934. Pneumatic or elastic wheel tire. G. W. Beldam, Ealing, and A. U. B. Ryall, Brentford—both in England.
1,220,956. Tire tool. P. W. Coffman, New Salem, Pa.

ISSUED APRIL 3, 1917.

1,221,060. Closet seat comprising a veneer of hard vulcanized rubber. E. C. B. Judd, assignor to The Brunswick-Balke-Collender Co.—both of Chicago, Ill.
1,221,084. Syringe. W. J. Norris, McLoud, Okla.
1,221,100. Envelope for inner tubes. C. F. Smith, Brighton, and C. A. White, Somerville, Mass.
1,221,181. Game table with elastic cover. R. G. Hooper, Delaware, Ohio.
1,221,246. Respirator. C. Travers, Frankenholz, near Mittelbexbach, Germany.
1,221,335. Vacuum nursing bottle and nipple therefor. J. N. Kline, Washington, D. C.
1,221,387. Respirator. J. A. Ste. Marie, Laprairie, Quebec, Canada.
1,221,446. Physician's mask. H. A. Hecht, Paterson, N. J.
1,221,473. Bathing cap. J. Riley, Jordon, Minn., assignor of forty-nine one-hundredths to Sarah Abrams, San Francisco, Calif.
1,221,479. Tire plug. R. W. Sampson, Whitestone, N. Y., assignor of one-half to L. Schwab, East Orange, N. J.
1,221,489. Elastic webbing. A. Turner, Leicester, England.
1,221,518. Flexible rubber surgical appliance. H. A. Dygert, Philadelphia, Pa.
1,221,721. Pneumatic tire carrying vehicle wheel. E. Gasper, Grass Valley, Calif.
1,221,759. Pneumatic tire. J. B. Lynch, Syracuse, N. Y.

ISSUED APRIL 10, 1917.

1,221,852. Convertible and inflatable life belt. A. Gerley, Buenos Aires, Argentina.
1,221,887. Making four-ply lock cord tires. R. M. Merriman, Akron, Ohio.
1,221,888. Four-ply lock cord tire. R. M. Merriman, Akron, Ohio.
1,221,912. Tire plug. R. W. Sampson, Whitestone, N. Y., assignor of one-half to L. Schwab, East Orange, N. J.
1,221,978. Tire protector. H. R. Decker, Houston, Tex.
1,222,070. Shoe for tires. W. L. Christian and P. Barker—both of Los Angeles, Calif.
1,222,114. Surf diving and skimming device. J. P. McCarty and F. W. Falck; said Falck assignor to R. G. Matzene—all of Los Angeles, Calif.
1,222,190. Recoil pad for fire arms. W. F. Dimelow, New York City.
1,222,211. Tire fastening device. F. P. Johnson, Danville, Pa.
1,222,283. Vehicle tire. M. Gray and B. Harris—both of New York City.
1,222,291. Recoil rubber pads for firearms. S. A. Huntley, assignor to The Huntley Manufacturing Co.—both of Omaha, Nebr.
1,222,467. Garter. L. L. Rogers, Boston, Mass., assignor to E. C. Moore, New York City.
1,224,494. Bust developer. J. T. Thomas, Clarinda, Iowa.
1,222,508. Life saving vest. M. Zawada, Cleveland, Ohio.
1,222,542. Demountable rim. J. W. Drummond, Chillicothe, Ohio.
1,222,555. Fountain pen. A. P. McArthur, Chicago, Ill.
1,222,563. Ground mat. N. Rosenberg, assignor of one-half to C. Schaefer—both of Chicago, Ill.

THE UNITED KINGDOM.

PATENT SPECIFICATIONS PUBLISHED.

In order to give the public the advantage of having abridgments of specifications up to date while retaining their numerical sequence, applications for patents made subsequent to 1915 are given new numbers when their complete specifications are accepted, or become open to public inspection before acceptance. The new numbers start with No. 100,001 (without any indication of date), and supersede the original application numbers in all proceedings after acceptance of the complete specifications.

ISSUED MARCH 7, 1917.

15,770 (1915). Corsets and abdominal belts having elastic sections. F. G. Baugatz, 37 Boulevard des Capucines, Paris.
15,844 (1915). Inner tube. C. H. May, 37 Prospect Road, Moseley, Birmingham.
15,866 (1915). Safety harness for aviators consisting of a belt of elastic webbing. H. L. Short, A. E. Short, and H. O. Short—all of 56 Prince of Wales Mansions, Queens Road, Battersea Park, London.
15,881 (1915). Protected pneumatic tire. J. A. Andrews, St. Margaret's Hotel, Osborn Road, Jesmond, Newcastle-on-Tyne.
15,904 (1915). Sleeve for insertion between tire tube and cover. W. C. Sneyd, 144 Broad street, Pendleton, and H. E. Young, 32 Broadway, Withington—both in Manchester.
15,959 (1915). Demountable rim. Standard Welding Co., West 76th street, assignees of R. S. Bryant, The New Amsterdam, cor. of Euclid avenue and East 22nd street—both of Cleveland, Ohio, U. S. A.
15,962 (1915). Wading boot. R. D. Carson, 1 Victoria street, Newton Stewart—both of Wigtownshire.
16,002 (1915). Pneumatic tire tread. R. G. Wooten, 141 Walmer Road, Toronto, Canada.
16,046 (1915). Sock-suspenders. R. K. Guinzburg, 725 Broadway, New York City, U. S. A.
103,077. Detachable rim. W. E. Copithorn, 49 North Main street, Natick, Massachusetts, U. S. A.
103,081. Solid rubber tire. G. A. Mortier, 5 Hall Road, Fulwood, Preston, Lancashire.
103,100. Life-saving device C. Thomas, 33 Tynycoed Terrace, Thomastown, Tonyrefail, Glamorganshire.

ISSUED MARCH 14, 1917.

16,126 (1915). Leggings made of waterproof material. G. G. Smith, 89 Kensington avenue, Manor Park, London.
16,193 (1915). Nipples for nursing bottles. F. C. Jones, 24 Belvedere Road, Upper Norwood, London.
16,219 (1915). Tire valves. R. S. Burn, The Poplars, Wylde Green, Birmingham.
16,264 (1915). Club or cane having a core of wire and a body part of rubber. E. E. Weflen, 5 Gruners Gate, Christiania.
16,282 (1915). Rubber or balata driving belts. A. Carlsen, 1 Badstuestraede, Copenhagen.
16,326 (1915). Rubber tip for crutches. C. Douglas, 303 Waterloo street, Oldham.

Chemical Patents will be found on page 453. Machinery and Process Patents on pages 456-457.

103,171. Tubeless pneumatic tire. C. V. Boys, 66 Victoria street, Westminster.

103,187. Pot for disinfecting dental and surgical instruments, provided with a rubber pad. F. G. Mordaunt, 49 Clarkgrove Road, Sheffield.

103,256. Detachable rim. C. L. Kennedy, 1305 Ingraham street, Los Angeles, California, U. S. A.

ISSUED MARCH 21, 1917.

16,426 (1915). Wheel tires. J. Taylor, 15 Lord Byron street, Eccles New Road, Salford, Lancashire.

16,517 (1915). Rubber fly swatter. G. W. Gomber, Conyngham, Pennsylvania, U. S. A.

16,503 (1915). Rubber or gutta percha combined with leather in shoe soles. H. E. G. Bateman, 18 The Western Broadway, King street, Hammersmith, and J. T. Barkwith, 10 Bramber Road, West Kensington—both in London.

16,539 (1915). Wheel in which annular rubber cushions are secured between and to the sides of the spoke ring and flanges on the axle box. A. E. Russell, 77 Henry street, Windsor, and W. G. Charley, 454 Collins street—both in Victoria, Australia.

16,579 (1915). Combination cushion and pneumatic tire. R. Blakoe, 62A Queen's Road, Bayswater, London.

16,589 (1915). Fountain pens. L. E. Waterman & Co., 173 Broadway, New York City, assignees of E. F. Britten, 21 Van Reipen avenue, Jersey City, New Jersey, U. S. A.

16,612 (1915). Convertible waterproof covers. W. B. Robeson, Port Huron, Michigan, U. S. A.

16,665 (1915). Reservoir pens. C. Bristow, The Chestnuts, Brockley View, Forest Hill, London.

16,676 (1915). A trench boot or wader. J. S. Kruse, Regent Palace Hotel, Piccadilly Circus, London.

16,750 (1915). Rubber-covered artificial feet. G. Hardman, "Belmont," Audenshaw Road, Audenshaw, Manchester.

103,304. Pneumatic tire casing. P. Nivet and J. B. Haegy, Luxé (Charente), France.

103,335. Diaphragms with vulcanite attachments for telephones. T. Chalmers, 81 Underwood Lane, West street, Crewe, Cheshire.

103,348. Tire formed of alternate layers of plain and spongy rubber enclosed within a plain rubber cover. A. A. Crozier, 3 Woodquest avenue, Herne Hill, London.

ISSUED MARCH 28, 1917.

16,841 (1915). Respirator with rubber bands for attaching to wearer's head. F. Morris, "Lea Hurst," Willows avenue, Lytham, Lancashire.

16,849 (1915). Diving suit. Neufeldt & Kuhnke, Werk Ravensberg am Habsburger Ring, Kiel, Germany.

16,851 (1915). Crutches having inflated tubes in arm pads and foot. J. C. Roberts, Mercantile Bank of India, 15 Gracechurch street, London.

16,900 (1915). Multi-core cable. J. H. Bowden, 101 Eltham Road, and H. F. J. Thompson, 65 Cambridge Mansions, Battersea Park—both in London.

103,412. Crutch with inflatable rubber bag upon the top of the crutch head. A. R. Hunter, Pine Lodge, Welbeck, near Worksop, Nottinghamshire.

103,434. Life-saving attachment. S. Goldreich, C. A. McKerrow, T. G. Jacobs and Life Saving Device Syndicate, Basildon House, Moorgate street, London.

103,452. Spring wheel with rubber block tire. W. F. Supernaw, 380 Alexander avenue, Elgin, Illinois, U. S. A.

103,471. Double-ended inner tube. Miller Rubber Co., assignees of F. Felton—both of Akron, Ohio, U. S. A.

103,478. Tire inflating valves. M. C. Schweinert, 226 Palisade avenue, West Hoboken, New Jersey, U. S. A.

103,485. Hand tools for artificial arms comprising a rubber-faced arm section. Siemens-Schuckertwerke, Seimensstadt, near Berlin.

103,491. A safety pocket closing device comprising an endless elastic band. J. W. Hawkins, Munsfordville, Kentucky, U. S. A.

103,522. Tire inflating valve. T. Sloper, Southgate, Devizes, Wiltshire.

THE DOMINION OF CANADA.

ISSUED DECEMBER 30, 1916.

173,613. Hoof pad. E. Kempshall, Atlantic City, New Jersey, U. S. A.

173,619. Pneumatic tire. A. M. Kobiolke, Kew, near Melbourne, Victoria, Australia.

173,663. Pneumatic tire. R. G. Wooten, Toronto, Ontario.

173,736. Pneumatic tire. J. C. Anderson, Washington, District of Columbia, U. S. A.

173,748. Rim for pneumatic tires. G. Cassady, New Westminster, British Columbia.

173,761. Demountable rim. H. E. Doebler, Cannon Falls, Minnesota, U. S. A.

173,771. Flexible rim. O. Gingras, Laurierville, Quebec.

173,795. Resilient tire. J. La Plant, Malone, New York, U. S. A.

173,818. Metal filler for pneumatic tires. C. M. Nevins, Hillsdale, Michigan, U. S. A.

173,821. Cushion tire. W. H. Overmoyer, Roselawn, Indiana, U. S. A.

173,838. Clincher tire rim. D. H. Shapiro, Montreal, Quebec.

173,852. Inner tube. E. W. Wilson, Springfield, Illinois, U. S. A.

173,853. Tire rim. E. W. Wilson, Springfield, Illinois, U. S. A.

173,854. Pneumatic tire. E. W. Wilson, Springfield, Illinois, U. S. A.

173,860. Tire rim. P. S. Whiting, Detroit, Michigan, U. S. A.

173,861. Tire rim. P. S. Whiting, Detroit, Michigan, U. S. A.

173,913. Spring and rubber cushion tire. H. L. McNeill, Truro, Nova Scotia.

173,960. Garter. M. B. Hammond, Bridgeport, Conn.

173,964. Rim tool. M. M. Herman, Danville, Virginia, U. S. A.

174,062. Garter. G. Abraham, New York City, assignee of H. E. Grabau, Long Island City—both in New York, U. S. A.

174,080. Tire tread. R. Aue, Leon Springs, Texas, U. S. A.

174,137. Spring and rubber cushion tire. B. A. Lange, St. Louis, Missouri, U. S. A.

174,143. Cushion tire. J. Milne, New York City, U. S. A.

174,232. Pneumatic tire. E. Knechtel, Toronto, and A. Snelgrove, assignee of a third interest, Fort William, Thunder Bay District—both in Ontario.

174,247. Demountable rim. I. D. Walter, assignor; J. G. Gant and T. Flournoy, each one-twentieth of the interest; J. W. Gant and S. A. Latimer, each one-fiftieth; and B. F. Cole, one-tenth, and to J. Brunkerhoff, fifty-three one-hundred and fiftieths of the interest—all of Harrisburg, Arkansas, U. S. A.

THE FRENCH REPUBLIC.

PATENTS ISSUED (WITH DATES OF APPLICATION).

481,922 (May 31, 1916). Metal tire. C. Montanari.

481,929 (June 2, 1916). Improvement in tools for removing tires. A. A. Friestedt.

481,937 (June 3, 1916). Pneumatic tire with envelope composed of a number of removable elements. P. E. Van Berendonck.

481,954 (June 5, 1916). Improvements in pneumatic tires. G. Ishihara.

481,955 (June 5, 1916.) Insulators for storage batteries. India Rubber Co.

481,966 (June 7, 1916). Valve for pneumatic tires with device for indicating the air pressure. Ashelman and Johnson.

482,032 (June 14, 1916). Elastic wheel for vehicles. J. Duran-Pinana.

482,058 (June 16, 1916). Improvements in hollow tires. W. Humphrys.

482,073 (June 19, 1916). Apparatus for removing the insulating sheath from electric wires.

AUSTRALIA.

PATENTS ISSUED (WITH DATES OF APPLICATION).

305 (February 14, 1916). Contrivance to prevent capillary attraction of waterproof garments. W. H. Poppleston for R. H. Popplestone, England.

950 (May 6, 1916). Improvements in tire valve caps and analogous devices. Schrader's Son, Inc., for H. P. Kraft, New Jersey, U. S. A.

951 (May 6, 1916). Improvements relating to washers for tire valve caps. Schrader's Son, Inc., for H. P. Kraft, New Jersey, U. S. A.

1081 (May 25, 1916). Improvements in pneumatic tires. C. Phillips and V. Sudakoff, New South Wales.

1735 (August 8, 1916). Pneumatic tire cover to prevent cavities between the inner and outer casings when they are combined. S. R. V. Clifford, Victoria.

TRADE-MARKS.

THE UNITED STATES.

100,143. The words SWEET BABEE—nursers, nursing bottles, and rubber nipples. D. W. B. Smith, Utica, N. Y.

71,059. The word UNIKA—rubber boots and shoes. L. Candee & Co., New Haven, Conn.

98,240. The words EASY RITE—men's and ladies' leather, rubber and cloth shoes, raincoats, etc. John P. Davis, Chicago, Ill.

100,191. The word MADERITE—tennis balls. The Seamless Rubber Co., New Haven, Conn.

100,593. The word SEMCO—belting, hose, machinery packing, and non-metallic tires. Semple Rubber Co., Trenton, N. J.

100,696. The words FRUITS & FLOWERS—chewing gum. American Chicle Co., New York City.

100,836. The words LIMP IN AND WALK OUT—rubber and leather footwear. B. Wigely, Chillicothe, Mo.

101,153. The words BEN HUR—rubber tires, hose and belting. The Midland Tire & Rubber Co., Cleveland, Ohio.

101,160. The word USCO—rubberized air-craft fabrics. United States Rubber Co., New York City.

101,413. The word MAGNET—rubber boots and shoes and fabric shoes having rubber soles attached thereto by vulcanization. United States Rubber Co., New York City.

101,414. The word PARAMOUNT—rubber boots and shoes and fabric shoes having rubber soles attached thereto by vulcanization. United States Rubber Co., New York City.

101,416. The word LOYALTY—rubber boots and shoes and fabric shoes having rubber soles attached thereto by vulcanization. United States Rubber Co., New York City.

101,611. The word ARLEN—lightweight rubbers. Mishawaka Woolen Manufacturing Co., Mishawaka, Ind.

101,612. The word RONDO—lightweight rubbers. Mishawaka Woolen Manufacturing Co., Mishawaka, Ind.

101,614. The word ZOLA—lightweight rubbers. Mishawaka Woolen Manufacturing Co., Mishawaka, Ind.

101,615. The word MISHKO—composition soles used on rubber and woolen footwear. Mishawaka Woolen Manufacturing Co., Mishawaka, Ind.

99,833. The word MEPHISTO and a representation of Mephistopheles—compressed fiber sheet packing. Asbestos Fibre & Rubber Co., Trenton, N. J.

100,736. The word UNIVERSAL and the representation of a globe showing the western hemisphere including North and South America—rubber heels. J. H. Brown, Marseilles, Ill.

101,324. The word COLONIAL—rubber tires for automobiles and other vehicles. The Colonial Tyre & Rubber Co., New York City.

101,490. The word EMERGENCY—rain-coats. F. W. Howard, New York City.

100,652. The words HUDSON-UNIVERSAL—canvas, leather, and combination canvas and rubber belting. Hudson Mechanical Rubber Co., New York City.

THE UNITED KINGDOM.

376,918. The word TALLY-HO—hair combs. The North British Rubber Co., Limited, Edinburgh, Scotland.

376,919. The word ECLIPSE—hair combs. The North British Rubber Co., Limited, Edinburgh, Scotland.

376,988. The word TALISMAN—hair combs. The North British Rubber Co., Limited, Edinburgh, Scotland.

THE DOMINION OF CANADA.

22,191. The word RUB-STEEL—valves, tools, machine parts and hardware. Voorhees Rubber Manufacturing Co., Jersey City, New Jersey, U. S. A.

22,216. The word LISTERATED—chewing gum. Common Sense Gum Co., Inc., New York City, U. S. A.

22,224. The word ENCHANTRESS—vulcanite combs. The North British Rubber Co., Limited, Toronto, Ontario.

22,225. The words BLACK BEAUTY—vulcanite combs. The North British Rubber Co., Limited, Toronto, Ontario.

22,226. The words BULL DOG and the representation of a bull dog—vulcanite combs. The North British Rubber Co., Limited, Toronto, Ontario.

22,235. The word ARCOC—tires and other goods used on or with motor vehicles, and manufactured in whole or in part of rubber. E. P. Stephenson, Toronto, Ontario.

ITALY.

16,156. The word VIKING—tires. Palmer Tyre, Limited, London.

AUSTRALIA.

21,112. Representation of a beaver crouching in front of hollowed-out branch—goods manufactured from rubber and gutta percha. Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, Canada.

DESIGNS.

THE UNITED STATES.

50,512. Golf ball with a specially designed corrugated surface. Term 14 years. Patented March 27, 1917. A. Johnston, assignor to The North British Rubber Co., Limited—both of Edinburgh, Scotland.

50,553. Golf ball. Term 7 years. Patented April 3, 1917. J. P. Cochrane, Edinburgh, Scotland.

DESIGNS FOR TIRES.

THE DOMINION OF CANADA.

4,170. Non-skid tread for the tires of automobiles and similar wheels. The F. E. Partridge Rubber Co., Limited, Guelph, Ontario, Canada.

STATEMENT OF THE INDIA RUBBER WORLD.

Statement of the ownership, management, etc., required by the Act of Congress of August 24, 1912, of THE INDIA RUBBER WORLD, published monthly at New York, N. Y., for April 1, 1917.

STATE OF NEW YORK } ss.
COUNTY OF NEW YORK }

Before me, a notary public in and for the State and county aforesaid, personally appeared E. M. MacPhee, who having been duly sworn according to law, deposes and says that she is the Business Manager of THE INDIA RUBBER WORLD, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, The India Rubber Publishing Co., 25 West Forty-fifth street, New York City.

Editor, Henry C. Pearson, 83 Agawam Road, Waban, Massachusetts.

Managing Editor, None.

Business Manager, E. M. MacPhee, 25 West Forty-fifth street, New York City.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

Henry C. Pearson, 83 Agawam Road, Waban, Massachusetts.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by her.

E. M. MACPHEE, Business Manager.

Sworn to and subscribed before me this 31st day of March, 1917.

[SEAL] FREDK. SPRENGER,
Notary Public, Westchester County.

Certificate filed in New York County.
New York County Clerk No. 188. Register's No. 8226.
(My commission expires March 30, 1918.)

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

[291.] An inquirer seeks a manufacturer able to make a special type of automobile tire.

[292.] An inquiry has been received for Holland cloth.

[293.] Names and addresses of manufacturers of spreading and doubling machines are requested.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

A merchant in Nicaragua desires to purchase garters and sleeve supporters. Report No. 24,056.

Samples and quotations from American manufacturers and exporters of suitings for rainproof capes are desired by a firm in the Dutch East Indies. Report No. 24,112.

A manufacturer in Spain is in the market for machinery for making rubber balls and other rubber articles. Report No. 24,125.

A firm in Chile wishes to buy elastic goods, garters and other accessories used in making corsets. Report No. 24,139.

A firm in Spain is in the market for tire presses. Report No. 24,166.

An agency for the sale of vulcanized rubber goods is desired by an applicant in Peru. Report No. 24,168.

A company in China wishes to receive catalogs, prices, etc., from American manufacturers of druggists' sundries. Report No. 24,180.

An applicant in Denmark desires to purchase or secure the agency for the sale of rubber goods, such as automobile and bicycle tires, inner tubes, boots and shoes, air and water cushions, gloves, tennis balls, football bladders, combs, sponges and sponge bags. Report No. 24,201.

A firm in the United States, representing firms in Mexico, Porto Rico, Spain, Australia and Switzerland, is in the market for electrical supplies and hard rubber razor handles. Report No. 24,215.

Representation of American manufacturers and exporters of automobile tires and accessories is desired by an applicant in Spain. Report No. 24,252.

An agency is desired by a man in Switzerland for the sale of rubber and rubber goods. Report No. 24,270.

A COMMERCIAL ATTACHE AT TOKIO.

The recent appointment of Frank R. Rutter as commercial attaché at Tokio directs attention once more to our increasing staff of so-called "trade diplomats" through which the United States hopes to improve its commercial relations abroad. Our broadening trade opportunities were recognized by the Government soon after the outbreak of the European war and attachés have since been stationed at London, Paris, Petrograd, Peking, Melbourne, Buenos Aires, Rio de Janeiro, Lima and Santiago, Chili. The growing importance of American trade with Japan has led to another similarly happy appointment by Secretary Redfield. Mr. Rutter is well fitted for the post, having been assistant chief of the Bureau of Foreign and Domestic Commerce, in charge of the statistical, editorial, foreign tariff and cost of production work of the Bureau. He has an intimate knowledge of the tariff laws of foreign countries and the methods of administering them, and for several years has been a lecturer on commerce in several universities, including Johns Hopkins, of which he is a graduate.

The United States Post Office authorities have declared the Double Service Tire & Rubber Co., Akron, Ohio, fraudulent and are returning to the writers all mail directed to this concern.

Review of the Crude Rubber Market

Copyright 1917.

NEW YORK.

CRUDE rubber business during the past month has been considered fair in some quarters, while in others trading has been reported as dull and featureless. While considerable turn-over business has been freely indulged in by the dealers forming the bulk of the month's transactions, the manufacturers have covered their immediate requirements by quietly picking up small lots. The war declaration was followed by a very firm undertone and stiffer prices that seemed to presage the advance forecasted by the bull element. However, the movement lacked support and the market eased off without recording price changes worthy of mention. Even the report of a government tax on crude rubber failed to stimulate the dormant buying interests; however, later it was reported that the war revenue measure would not include crude rubber.

The scarcity of bottoms and the unfavorable financial conditions in the Far East are delaying direct shipments, four months being required for cargoes *via* Pacific Coast ports. Moreover, the preference given by the railroads to necessities, such as foodstuffs, military supplies, etc., has resulted in holding rubber arrivals at Seattle and San Francisco. Spot stocks appear to be cleaned up and nearby is getting very scarce. Arrivals are slow and the shipping situation continues to grow steadily worse. During the month several direct New York shipments from the East were diverted to Liverpool and London, a fact that still further shows the lack of bottoms. Freight rates from Colombo have advanced, and the insurance on London shipments is now 5 guineas the ton, equivalent to $25 United States money.

Plantation prices have shown very little change during the month. April 1 first latex and smoked sheet ribbed, spot, were quoted 81 cents; April-May, 79 cents, and July-December, 73 cents. Upriver fine spot was 76½ cents. Steady conditions prevailed during the month, with minor price changes and on April 27 first latex and smoked sheet ribbed, spot, were 82 cents; May-June, 80 cents, and July-December, 75 cents. Market conditions very firm. The knowledge that there is plenty of rubber at producing centers is having a steadying effect on the market that would otherwise be adversely influenced by the shipping situation. Africans have received but little attention, while Centrals, particularly during the last week of the month, were in active demand.

LONDON.

Quiet conditions have ruled the London market during April; however, the undertone has been generally steady. Conservative buying has characterized the trading that lacked in volume, due to the absence of real interest. The effect of America's entry in the war was watched with interest in London, and when the active buying that was expected did not occur the trade settled down to watchful waiting. Prices show very little change for the first three weeks of the month, holding around 75 cents for first latex and smoked sheet ribbed. On April 27 the standard plantation grades were quoted 36*d.*, or about 72 cents in a very firm market.

The following estimate of the world's production and consumption of rubber during the next four years is by C. A. Lampard, the well-known rubber prophet, now deceased:

Year.	Production.	Consumption.
1917.....*tons*	235,000	230,000
1918.....	265,000	260,000
1919.....	295,000	290,000
1920.....	314,000	312,000

No allowance has been made in these estimates for the German and Austrian post-war demand, which is not expected to be less than 26,000 tons per annum. Apart from this it will be seen that during the four years in question it is thought that supply and demand will remain very nearly balanced.

London imports for February were 4,748 tons, compared to 6,364 tons for January. Re-exports were 5,043 tons, compared to 4,473 tons for January. Liverpool imports for February were 2,410 tons, compared to 1,215 tons for January. Re-exports were 1,331 tons, compared to 976 tons for January.

SINGAPORE.

The cables from Singapore indicate a good demand for all grades. At the auctions, held March 30, April 6, 14 and 21, the average prices obtained were as follows: First latex, crêpe, 68.6 cents; smoked sheet ribbed, 68.9 cents. The total amount sold was 2,105 tons.

NEW YORK SPOT QUOTATIONS.

	May 1, 1916.	April 1, 1917.	April 27, 1917.
PLANTATION PARAS—			
First-latex crêpe	78½	81	82
Amber crêpe, light gristly	76	79	78½
Amber crêpe, dark	..	77	78
Brown crêpe, thick clean	..	75	77
Brown crêpe, thin clean, light mottled	..	78	78
Brown crêpe, thin clean	75	77	77
Brown crêpe, thin specky	..	72	72
Brown crêpe, thin barkey	..	69	68
Brown crêpe, rolled	..	65	65
Smoked sheet, ribbed standard quality	77½	81	82
Smoked sheet, plain standard quality	..	79	80½
Unsmoked sheet, standard quality	..	78	78½
Singapore scrap, No. 1	..	63	63
Singapore scrap, No. 2	..	61	61
Colombo scrap, No. 1	..	64	64
Colombo scrap, No. 2	..	62	62
BRAZILIAN PARAS—			
Upriver fine	70½	76½	75
Upriver medium	65	70	70
Upriver coarse	54½	51½	51
Knapsack Madeira	..	82	82
Peruvian fine	..	74	73
Upriver weak fine	..	65	65
Upriver caucho ball	55	51½	51
Tapajos fine	..	74	73
Islands fine	..	72	72
Islands medium	..	66	66
Islands coarse	34	36	33½
Islands weak fine	..	54	54
Cameta	38½	38	36½
Lower caucho ball	..	48	48
AFRICANS—			
Accra flake	..	33	31
Niger flake	..	34	31
Benguela, extra seconds, 28%	..	41½	41½
Benguela, No. 2 32½%	..	39	39
Benguela, No. 3, 40%	..	33½	33½
Congo prime, black upper	..	65	63
Congo prime, red upper	..	60	59
Rio Nunez ball	..	66	66
Rio Nunez sheets and strings	..	66	66
Conakry niggers	..	65	66
Massai sheets and strings	..	65	65
CENTRALS—			
Esmeralda sausage	50	50	50
Central scrap	49	49	49
Central scrap and strip	48	48	48
Central wet sheet	35	35	35
Guayule	..	44	50
MANICOBAS—			
Ceara scrap	..	35	35
Ceara negro heads	..	49	49
Manicoba special	..	38	38
Manicoba extra	..	35	35
Manicoba regular	..	32	32
Mangabeira thin sheet	..	38	38
Mangabeira thick sheet	..	33	33
BALATA—			
Balata block	..	68	65
Surinam sheet	..	95	95
EAST INDIAN—			
Assam crêpe	..	75	75
Assam onions	..	73	73
Penang block scrap	..	35	35
Pontianak pressed	..	25	25
Bandjermassin	..	20	20
Gutta percha, red Macassar	..	210	225

COMPARATIVE NEW YORK PRICES FOR APRIL.

In regard to the financial situation, Albert B. Beers (broker in crude rubber and commercial paper, No. 68 William street, New York) advises as follows:

"During the early part of April the demand for commercial paper continued fairly good, the best rubber names selling at 4½@5 per cent, and those not so well known 5@5½ per cent, but since the middle of the month the demand has fallen off considerably and rates are rather higher."

	1917.*	1916.	1915.
Upriver, fine	75@77	72@74	57@60
Upriver, coarse	51@52	55@57	46@48
Islands, fine	72@74	65@69	52@55
Islands, coarse	35@36	36@40	30@33
Cameta	37@39	38@40	33@37

*Figured only to April 27.

MARKET CABLE SERVICE FROM LONDON.

The following market report has been cabled from Aldens' Successors, Limited, London.

	Standard Crepe.	Ribbed Smoked Sheets.	Market.
March 26	37½d.	37½d.	Quiet.
April 2	37½d.	37½d.	Steady.
April 10	37¾d.	37¾d.	Buyers.
April 16	37¾d.	37¾d.	Buyers.
April 23	36½d.	36 d.	Very Firm.

MARKET CABLE SERVICE FROM SINGAPORE.

The following reports of the weekly auctions held at Singapore have been cabled by The Waterhouse Co., Limited:

Date.	Crepe price per lb.	Smoked sheet price per lb.	Tons sold.	Market.
March 30 ..... *cents*	68.00	68.42	575	There is more demand.
April 6	68.85	69.70	562	Firm with an upward tendency.
April 14	69.70	69.70	530	Good demand for all descriptions.
April 21	68.00	68.00	438	Dull with a downward tendency.

WEEKLY RUBBER REPORT.

Guthrie & Co., Limited, Singapore report, March 8, 1917.

At the weekly rubber auction held yesterday and today a further advance in the prices of standard grades was registered. Fine ribbed smoked sheet fetched up to $175 per picul for one lot, being $3 above last week's best. The highest paid for fine pale crepe was $174, an advance of $4. Of unsmoked sheet only the better quality lots were in demand, and a considerable quantity was bought in. Brown crepes sold well, at about last week's prices, but dark and barky crepes were neglected, and suffered a decline in values. Demand throughout was somewhat erratic, and eased off towards the end of the sale. The quantity sold was 580 tons, out of a total of 864 tons catalogued.

The following was the course of values:

	In Singapore per picul.*	Sterling equivalent per pound in London.	Equivalent per pound in cents.
Sheet, fine ribbed smoked	$168@175	3/ 2¾@3/ 4¼	71.40@74.37
Sheet, good ribbed smoked	140@167	2/ 8⅞@3/ 2⅝	59.50@70.97
Sheet, plain smoked	132@146	2/ 7¼@2/10⅛	56.10@62.05
Sheet, ribbed unsmoked	133@135	2/ 7⅛@2/ 7⅞	56.52@57.37
Sheet, plain unsmoked	105@135	2/ 1½@2/ 7⅞	44.62@57.37
Crepe, fine pale	170@174	3/ 3¼@3/ 4	72.25@73.95
Crepe, good pale	154@170	2/11⅞@3/ 3¼	65.45@72.25
Crepe, fine brown	140@153	2/ 8⅞@2/11⅜	59.50@65.02
Crepe, good brown	122@141	2/ 5⅛@2/ 9⅛	51.85@59.92
Crepe, dark	101@126	2/ 0¾@2/ 6	42.92@53.55
Crepe, bark	77@114	1/ 7¾@2/ 3½	32.72@48.45
Scrap, virgin and pressed	86@	1/ 9½@	36.55@
Scrap, loose	65@ 93	1/ 5⅛@1/11⅜	27.62@39.52

* Picul = 133⅓ pounds.
Quoted in S. S. dollars = 2/4 [56.7 cents].

PLANTATION RUBBER FROM THE FAR EAST.

TOTAL EXPORTS FROM MALAYA.

(From January 1, 1916, to dates named, excluding all foreign transhipments. Reported by Barlow & Co., Singapore.)

To—	From Singapore. January 31, 1917.	Malacca. January 31, 1917.	Penang. January 31, 1917.	Port Swettenham. January 27, 1917.	Totals.
United Kingdom ..*lbs.*	3,251,880	659,475	2,591,600	2,966,128	9,469,083
The Continent	108,121	.....	47,067	.....	155,188
Japan	427,535	.....	.....	.....	427,535
Ceylon	131,009	.....	109,867	87,368	328,244
United States	6,110,552	.....	1,456,533	523,024	8,090,109
Totals	10,029,097	659,475	4,205,067	3,676,520	18,460,159
Same period, 1915	11,494,667	408,800	5,946,267	2,529,553	20,379,287
Same period, 1914	4,408,928	537,281	4,135,865	3,188,608	11,265,682
Same period, 1913	2,771,704	.....	3,717,200	2,594,807	9,083,711

IMPORTS AND EXPORTS OF RUBBER AND GUTTA AT SINGAPORE.*

IMPORTS.

From—	February, 1917. Para Rubber.	Para Rubber for Treatment.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
Malay Peninsula—					
Port Swettenham	1,295,200	.....	.....	.....	.....
Teluk Anson	905,999	.....	.....	.....	.....
Muar	649,999	.....	.....	.....	.....
Malacca	611,733	592,798	.....	.....	.....
Penang	504,332	38,533	.....	.....	.....
Port Dickson	161,999	.....	.....	.....	.....
Kelantan	101,870	17,600	.....	.....	.....
Kuantan	20,123	.....	.....	.....	.....
Rengat	15,600	16,799	.....	.....	.....
Mersing	6,533	.....	.....	.....	.....
S. Pandjang	1,066	.....	.....	.....	.....
Totals	4,274,454	665,730	.....	.....	.....
Borneo—					
Sarawak	72,133	30,000	800	10,133	218,666
Pontianak	59,866	2,000	2,800	1,999	14,800
Jesselton	47,332	187,430	.....	400	.....
Bandjennassin	42,266	46,400	4,000	102,933	24,000
Labuan	37,866	.....	.....	1,866	62,933
Sibu	31,866	.....	133	16,533	84,400
Sandakan	12,532	25,066	.....	.....	1,066
Sambas	10,533	.....	.....	.....	.....
Passir	9,066	.....	.....	.....	.....
Kudat	8,533	10,133	.....	.....	.....
Singkawang	533	.....	.....	.....	.....
Samarinda	400	.....	1,733	400	.....
Totals	332,966	301,029	9,466	134,264	405,865
Sumatra—					
Djambi	219,600	.....	.....	.....	.....
Deli	39,866	626,266	.....	.....	.....
Palembang	17,733	.....	.....	.....	45,999
Indragiri	5,866	.....	.....	.....	.....
Bengkalis	2,666	.....	.....	.....	.....
Muntok	1,200	.....	.....	.....	.....
Asahan	.....	67,199	.....	.....	.....
Belawan	.....	86,399	.....	.....	.....
Totals	286,931	779,864	.....	.....	45,999
Java—					
Batavia	188,666	.....	.....	.....	.....
Sourabaya	152,800	.....	.....	1,466	.....
Samarang	7,966	.....	.....	.....	.....
Totals	348,432	.....	.....	1,466	.....
Burma—					
Mergui	12,933	.....	.....	.....	.....
Rangoon	6,266	.....	.....	.....	.....
Total	19,199	.....	.....	.....	.....
Siam—					
Bangkok	1,199	.....	.....	.....	.....
Patani	133	.....	.....	.....	.....
Total	1,332	.....	.....	.....	.....
Other ports	117,066	205,600	7,733	15,066	96,800
Grand Totals	5,380,380	1,952,223	17,899	150,796	548,664

* Not complete; 6 days missing.

EXPORTS.

To—	February, 1917. Para Rubber.	Para Rubber Transhipped.	Borneo Rubber.	Gutta Percha.	Gutta Jelutong.
NORTH AMERICA:					
United States—					
New York ..... *pounds*	3,912,800	482,933	.....	114,533	629,466
Akron	1,422,399	18,000	.....	.....	.....
Seattle	772,666	99,866	.....	.....	.....
Boston	122,333	.....	.....	.....	.....
San Francisco	82,933	.....	.....	.....	.....
Denver	33,600	.....	.....	.....	.....
Canada—					
Vancouver	522,266	53,733	.....	.....	.....
Totals	6,869,997	654,532	.....	114,533	629,466
EUROPE:					
United Kingdom—					
England—					
London	980,531	1,876,999	.....	22,800	.....
Liverpool	587,733	260,999	.....	.....	56,533
Scotland—					
Glasgow	.....	.....	.....	11,466	.....
France (Marseilles)	176,933	.....	.....	.....	.....
Russia (Vladivostok)	4,266	.....	.....	.....	.....
Totals	1,749,463	2,137,998	.....	34,266	56,533
Grand Totals	8,619,460	2,792,530	.....	148,799	685,999

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official cablegram from Singapore gives the export of plantation rubber from the Straits Settlements for the month of February as 6,495 tons (of which 1,079 tons represent transhipments) compared with 3,562 tons in January and 3,359 tons in the corresponding month last year. The following are the comparative figures:

	1915.	1916.	1917.
January ..... *tons*	2,576	4,443	3,562
February	2,741	3,359	6,495
Total	5,317	7,802	10,057

RUBBER EXPORTS FROM JAVA.

			January.	
PLANTATIONS TO—			1916.	1917.
Great Britain	Ficus	*pounds*	1,364	515
	Hevea		463,680	250,880
	Ceara		.....	2,158
	Castilloa		5,685	2,638
	Totals		470,729	256,191
United States	Ficus		3,439	2,578
	Hevea		884,800	2,260,160
	Ceara		4,554	.....
	Totals		892,793	2,262,738
Singapore	Ficus		2,053	2,398
	Hevea		210,560	486,080
	Ceara		1,168	1,784
	Castilloa		2,255	.....
	Totals		216,036	490,262

IMPORTS AND EXPORTS OF RAW RUBBER AT CEYLON.

IMPORTS.	February 12 to March 12, 1917.			
Port of Shipment.	Straits Settlements.	India.	Burma and other countries.	Totals.
Port Swettenham ..... *pounds*	40,119	.....	.....	40,119
Port Dickson	21,325	.....	.....	21,325
Penang	7,837	.....	.....	7,837
Tuticorin	.....	33,335	.....	33,335
Cochin	.....	19,161	.....	19,161
Alleppy	.....	1,540	.....	1,540
Totals	69,281	54,036	.....	123,217

EXPORTS.				
Port of Destination.	North America.	Europe.	Oceania.	Asia.
United States—				
New York	1,340,203	.....	.....	.....
Seattle	44,740	.....	.....	.....
Boston	13,440	.....	.....	.....
Akron	4,480	.....	.....	.....
Canada—				
Vancouver	44,814	.....	.....	.....
Toronto	31,360	.....	.....	.....
England—				
London	.....	2,993,777	.....	.....
Liverpool	.....	184,816	.....	.....
Manchester	.....	10,467	.....	.....
Russia (Vladivostok)	.....	123,180	.....	.....
France (Marseilles)	.....	80,557	.....	.....
Australia—				
Melbourne	.....	.....	18,340	.....
Sydney	.....	.....	2,240	.....
Japan (Yokohama)	.....	.....	.....	4,448
Totals	1,479,037	3,292,797	20,580	4,448

EXPORTS OF CEYLON GROWN RUBBER.

(From January 1 to March 12, 1916 and 1917. Compiled by the Ceylon Chamber of Commerce.)

To—		1916.	1917.
United Kingdom	*pounds*	4,360,745	7,157,797
France		398,050	639,577
Italy		.....	33,600
Russia		18,695	123,180
Victoria		145,616	63,161
New South Wales		16,428	7,840
United States		6,020,090	3,523,662
Canada and Newfoundland		.....	212,814
India		550	.....
Japan		36,436	11,168
Totals		10,996,610	11,772,799

(Same period 1915, 7,853,033 pounds; same period 1914, 7,317,507.) The export figures of rubber, given in the above table for 1914, include the imports reëxported. (These amount to 246,549 pounds from the Straits Settlements and 633,848 pounds from India.) To arrive at the total quantity of Ceylon rubber exported for that year deduct these imports from the total exports. The figures for 1916 and 1917 are for Ceylon rubber only.

Japan	Hevea		33,600	.....
Other Countries	Hevea		.....	6,720
Grand Totals			1,613,158	3,015,911

EXPORTS OF RAW RUBBER FROM PENANG.

		February, 1917.		
To—		Para Rubber.	India Rubber.	Borneo Rubber.
North America:				
United States—				
Seattle	*pounds*	639,733	.....	.....
New York		179,200	.....	.....
Akron		22,266	.....	.....
Canada—				
Vancouver		20,133	.....	.....
Total		861,332	.....	.....
Europe:				
United Kingdom—				
England (London)		4,293,200	197,333	.....

MOVEMENTS OF ALL KINDS OF RUBBER IN THE UNITED KINGDOM.

IMPORTS.

		February.			Two months ending February		
From—		1917.	1916.	1915.	1917.	1916.	1915.
Dutch East Indies	*tons*	666	197	140	1,440	453	423
French West Africa		79	22	29	93	84	38
Gold Coast		33	45	8	33	80	22
Other Countries in Africa		355	382	35	859	617	431
Peru		61	122	4	118	248	36
Brazil		1,690	1,064	1,035	2,596	1,864	1,309
British India		208	56	155	424	292	372
Straits Settlements		1,337	1,457	2,342	2,710	3,717	5,792
Federated Malay States		1,976	489	753	4,908	1,888	1,844
Ceylon and Dependencies		647	702	1,558	1,672	1,791	3,444
Other Countries		255	56	132	428	156	227
Total imports		7,307	4,592	6,191	15,281	11,190	13,938

EXPORTS.

From—	1917.	1916.	1915.	1917.	1916.	1915.
United Kingdom	6,492	4,429	4,966	12,216	8,267	6,855

Compiled by Gow, Wilson & Stanton, Ltd.

CRUDE RUBBER ARRIVALS AT THE PORT OF NEW YORK.

The following statistics are not complete, due to Government orders prohibiting access to the records.

[*The Figures Indicate Weight in Pounds.*]

PARAS.

	Fine.	Medium.	Coarse.	Caucho.	Cameta.	Totals.
MARCH 27.—By the *Allianca*=Lima:						
Muller, Schall & Co.	128	.....	2,330	.....	.....=	2,458
Henderson & Korn	2,100	.....	.....	.....	.....=	2,100
MARCH 31.—By the *Cuthbert*=Para and Manaos:						
Meyer & Brown	118,000	15,000	77,000	125,000	39,000=	374,000
Hagemeyer Trading Co. ...	22,400	.....	.....	44,800	.....=	67,200
H. A. Astlett & Co.	66,080	10,640	51,520	20,160	.....=	148,400
Raw Products Co.	15,255	1,238	4,452	.....	.....=	20,945
Raw Products Co.	23,100	.....	.....	23,310	.....=	46,410
APRIL 3.—By the *Colon*=Bolivia:						
Muller, Schall & Co.	13,758	.....	4,471	.....	.....=	18,229
APRIL 4.—By the *Mandeville*=Porto Colombia:						
Muller, Schall & Co.	915	.....	.....	.....	.....=	915
APRIL 4.—By the *Sao Paulo*=Para.						
Muller, Schall & Co.	41,255	15,313	55,582	17,482	.....=	129,632
Meyer & Brown	29,000	5,000	29,000	22,000	14,800=	99,800
Henderson & Korn	55,200	3,200	52,400	33,800	.....=	144,600
Hagemeyer & Brunn	44,800	.....	11,200	22,400	.....=	79,400
H. A. Astlett & Co.	8,400	1,680	105,280	154,560	106,960=	376,880
Raw Products Co.	8,836	.....	.....	.....	.....=	8,836
APRIL 13.—By the *Guajura*=Manoas and Para:						
Muller, Schall & Co.	158,625	11,968	57,622	82,902	.....=	311,117
Meyer & Brown	200	.....	46,000	187,000	.....=	233,000
Henderson & Korn	2,200	14,500	61,200	26,200	.....=	104,100
Hagemeyer & Brunn	10,080	.....	5,200	4,500	.....=	19,780
H. A. Astlett & Co.	162,960	10,080	69,440	94,080	.....=	337,560
Raw Products Co.	14,222	1,005	6,019	.....	.....=	21,246
APRIL 6.—By the *Zulia*=Cà Bolivar:						
Yglesias & Co., Inc.	2,871	.....	.....	.....	.....=	2,871
APRIL 25.—By the *Tela*=Para:						
Aldens' Successors, Ltd. ...	2,000	12,000	42,600	27,600	.....=	84,200

PARA VIA EUROPE.

	Pounds.
April 10.—By the *Carmania*=London:	
Henderson & Korn (Coarse)	26,600
Fred Stern & Co	2,800

PLANTATIONS.

The following statistics are not complete due to Government orders prohibiting access to the records:

March 30.—By the *Mesaba*=London:	
Rubber Trading Co	56,000
Meyer & Brown	66,000
March 27.—By the *Philadelphia*=London:	
Rubber Trading Co	15,680
Meyer & Brown	34,000
Fred Stern & Co	24,640
April 1.—By the *Mesaba*=London:	
Rubber Trading Co	44,800
Raw Products Co	5,818
April 2.—By the *Carpathia*=London:	
Meyer & Brown	15,000
J. T. Johnstone & Co	112,000
March 27.—By the *Eurybates*=Penang:	
Rubber Trading Co	107,520
Meyer & Brown	78,000
Henderson & Korn	275,200
Raw Products Co	15,680
Fred Stern & Co	49,280
March 27.—By the *Barotose*=Colombo:	
J. T. Johnstone & Co	310,000
Rubber Trading Co	11,200
Meyer & Brown	437,000
Henderson & Korn	35,600
Raw Products Co	11,200
Fred Stern & Co	112,000
J. T. Johnstone & Co	135,000
April 4.—By the *Merauke*=Batavia:	
Meyer & Brown	70,000
Rubber Trading Co	22,400
Raw Products Co	37,630
Hagemeyer Trading Co	72,196
Fred Stern & Co	6,720
J. T. Johnstone & Co	280,000
April 8.—By the *Manhattan*=London:	
Meyer & Brown	142,000
Rubber Trading Co	44,800
Henderson & Korn	66,200
Raw Products Co	11,144
Hagemeyer Trading Co	38,371
Fred Stern & Co	31,822
April 9.—By the *City of Edinburgh*=Colombo:	
Meyer & Brown	62,000
Rubber Trading Co	13,400
Fred Stern & Co	100,488
J. T. Johnstone & Co	72,000
April 10.—By the *Ansonia*=London:	
Meyer & Brown	119,000
Rubber Trading Co	33,600
Henderson & Korn	62,800
April 16.—By the *Lancastrian*=London:	
Meyer & Brown	11,000
Rubber Trading Co	11,200
Henderson & Korn	85,600
Hagemeyer Trading Co	22,400
April 12.—By the *Mohopac*=London:	
Raw Products Co	44,800
Aldens' Successors, Ltd	628,000
Fred Stern & Co	55,466
April 8.—By the *Malta*:	
Hagemeyer Trading Co	10,220
Fred Stern & Co	6,720
By the *Pannonia*=London:	
J. T. Johnstone & Co	255,000
By the *Nervisian*=London:	
Fred Stern & Co	11,200
By the *Ponpa*=London:	
Fred Stern & Co	11,200
By the *Mississippi*=London:	
Fred Stern & Co	80,640
By the *Michigan*=London:	
Fred Stern & Co	181,440

AFRICANS.

April.—By the *Baltic*=Liverpool:	
Rubber Trading Co	22,240
Fred Stern & Co	11,200
April.—By the *Chicago*=Bordeaux:	
Rubber Trading Co	11,200
March 16.—By the *Marengo*=Hull:	
Meyer & Brown	78,000
By the *Competitor*=Africa:	
Fred Stern & Co	291,200

MANICOBAS.

	Pounds.
March 10.—By the *Minas Geraes*=Bahia:	
Adolph Hirsch & Co	15,830
March 11.—By the *Spenser*=Bahia:	
Adolph Hirsch & Co	73,433
March 27.—By the *Strabo*=Bahia:	
Adolph Hirsch & Co	86,509
March 31.—By the *Cuthbert*=Ceara:	
Adolph Hirsch & Co	33,151
April 3.—By the *Sao Paulo*=Bahia:	
Adolph Hirsch & Co	27,644

GUAYULE.

March 28.—By the *El Sol*=Laredo:	
Continental Rubber Co. of New York	85,319
April 10.—By *all rail*=from Laredo:	
Continental Rubber Co. of New York	50,739
April 11.—By the *El Alba*=Eagle Pass:	
Continental Rubber Co. of New York	25,362
April 11.—By the *El Dai*=Eagle Pass:	
Continental Rubber Co. of New York	22,500
April 19.—By the *El Reo*=Eagle Pass:	
Continental Rubber Co. of New York	31,000

BALATA.

March 26.—By the *Mayaro*=Cà Bolivar:	
Yglesias & Co., Inc	10,570
March 30.—By the *Philadelphia*=Cà Bolivar:	
Yglesias & Co., Inc	5,454
April 3.—By the *Maraval*=Cà Bolivar:	
Yglesias & Co., Inc	13,351
April 6.—By the *Zulia*=Cà Bolivar:	
Yglesias & Co., Inc	28,544

RUBBER SCRAP.

March 8.—By the *Ascania*=London:	
Herman Weber	35,723
March 15.—By the *Bovic*=Manchester:	
Herman Weber	78,947
March 15.—By the *Ascania*=London:	
Herman Weber	32,939
J. T. Johnstone & Co	170,000
March 24.—By the *Ansonia*=London:	
Herman Weber	67,523

CRUDE RUBBER ARRIVALS AT SEATTLE.

PLANTATIONS.

TO SEATTLE.

	Pounds.	
March 22.—By the *Salthybius*=Yokohama:		
The B. F. Goodrich Co	392,040	
Aldens' Successors, Ltd	7,965	
W. R. Grace & Co	2,295	
The Goodyear Tire & Rubber Co.	63,585	465,885
March 23.—By the *Hokkai Maru*=Kobe:		
Mitsui & Co., Ltd		100,980
April 16.—By the *Caidigoushire*=Penang:		
The Goodyear Tire & Rubber Co		2,025
April 18.—By the *Saikai Maru*=Singapore:		
The B. F. Goodrich Co	390,690	
Hagemeyer Trading Co	34,155	
Rubber Trading Co	4,860	
East Asiatic Co	6,480	
J. T. Johnstone & Co	3,240	439,425
March 21.—By the *Mitsuki Maru*=Kobe:		
Mitsui Bussan Kaisha		163,350

TO AKRON, OHIO.

March 22.—By the *Talthybius*=Yokohama:		
J. T. Johnstone & Co	229,095	
The Goodyear Tire & Rubber Co.	93,420	322,515

	Pounds
March 28.—By the *Manila Maru*=Yokohama:	
Firestone Tire & Rubber Co	112,050
April 12.—By the *Bankoku Maru*=Singapore:	
The B. F. Goodrich Rubber Co	415,800
April 16.—By the *Agapenar*=Hongkong:	
The B. F. Goodrich Rubber Co	384,210
The B. F. Goodrich Co	557,685
Goodyear Tire & Rubber Co	270 557,955

TO NEW YORK.

	Pounds.	
March 22.—By the *Talthybius*=Yokohama:		
Henderson & Korn	26,000	
United States Rubber Co	365,985	
Hagemeyer Trading Co	33,615	
Charles T. Wilson Co., Inc	96,930	
L. Littlejohn & Co	114,345	
J. T. Johnstone & Co	29,970	
Edward Maurer & Co	75,330	
Robinson & Co	7,560	
Arnold & Zeiss	94,230	
Fred Stern & Co	15,120	
W. R. Grace & Co	44,450	
East Asiatic Co	11,610	
Meyer & Brown	81,000	
Arthur Meyer & Co	28,890	
W. H. Stiles & Co	80,325	
E. G. Curry	25,245	
L. M. Byles	11,205	
Frank B. Ross & Co	26,730	1,168,540
March 28.—By the *Manila Maru*=Hongkong:		
Robert Badenhop Co., Inc		97,200
April 12.—By the *Bankoku Maru*=Singapore:		
Rubber Tarding Co	1,755	
Aldens' Successors, Ltd	29,295	
Fred Stern & Co	14,580	
Edward Maurer & Co., Inc	61,830	
L. Littlejohn & Co	207,360	
W. R. Grace & Co	3,240	
Arthur Meyer & Co	3,510	321,570
April 16.—By the *Burma Maru*=Yokohama:		
Henderson & Korn	5,130	
Charles T. Wilson Co., Inc	37,260	
Robert Badenhop Co., Inc	170,235	
W. H. Stiles & Co	27,945	
Winter Son & Co	50,895	
Raw Products Co	10,800	
East Asiatic Co., Ltd	9,180	
Robinson & Co	5,670	
L. Littlejohn & Co	3,240	
W. R. Grace & Co	2,025	322,380
March 21.—By the *Panama Maru*=Yokohama:		
L. Littlejohn & Co	21,330	
Robinson & Co	5,670	
Arnold & Zeiss	4,725	
Fred Stern & Co	270	
W. H. Stiles & Co	7,155	
Edward Maurer & Co	27,945	67,095
By the *Kippon Maru*=Far East:		
J. T. Johnstone & Co		255,000
By the *Siberia Maru*=Far East:		
J. T. Johnstone & Co		293,000
By the *Tenyo Maru*=Far East:		
J. T. Johnstone & Co		140,000
By the *Darien Maru*=Far East:		
J. T. Johnstone & Co		14,000
By the *Canada Maru*=Far East:		
Fred Stern & Co		4,482
By the *Arakan*=Far East:		
J. T. Johnstone & Co		44,800
By the *Buitenzorg*=Far East:		
J. T. Johnstone & Co		205,000

TO WATERTOWN, MASS.

March 22.—By the *Talthybius*=Yokohama:	
Various	55,080
April 16.—By the	
Hood Rubber Co	64,800

TO DENVER, COLORADO.

March 22.—By the *Talthybius*=Yokohama:	
J. T. Johnstone & Co	22,220

TO TORONTO, CANADA.

March 22.—By the *Talthybius*=Yokohama:	
Various	84,240

GUTTA PERCHA.

TO SEATTLE.

April 9.—By the *Tamba Maru*=Yokohama:		
Brandts Sons & Co	28,755	
L. Littlejohn & Co	14,715	43,470
April 18.—By the *Saikai Maru*=Singapore:		
L. Littlejohn & Co		112,320

CRUDE RUBBER ARRIVALS AT SAN FRANCISCO.

	Pounds.	
MARCH 1.—By the *Persia Maru*=Manila:		
Mitsui & Co.		260
MARCH 6.—By the *China Maru*=Hong Kong:		
United States Rubber Co.	75,920	
L. Littlejohn & Co.	10,400	
Various	40,950	127,270
MARCH 12.—By the *Korea Maru*=Hong Kong:		
Henderson & Korn.	291,900	
L. Littlejohn & Co.	316,670	
Meyer & Brown.	37,780	
Fred Stern & Co.	9,607	
Arnold & Zeiss.	151,070	
W. H. Stiles & Co.	67,010	
E. G. Curry.	27,480	901,517
MARCH 12.—By the *Tjisondari*=Batavia:		
The B. F. Goodrich Rubber Co.	281,320	
United States Rubber Co.	25,220	
The Goodyear Tire & Rubber Co.	111,150	
L. Littlejohn & Co.	68,510	
John Edgar & Co.	28,340	$14,540
MARCH 24.—By the *Siberia Maru*=Hong Kong:		
Henderson & Korn.	122,100	
Rubber Trading Co.	21,840	
The Goodyear Tire & Rubber Co.	264,680	
Arnold & Zeiss.	237,380	
L. Littlejohn & Co.	80,860	
Winter Son & Co.	56,810	
W. H. Stiles & Co.	51,610	
East Asiatic Co.	43,680	
E. G. Curry.	21,840	900,800
MARCH 30.—By the *Venezuela* Ex. *Eurylus*=Singapore:		
Charles T. Wilson Co., Inc.	51,740	
Henderson & Korn.	23,270	
Hood Rubber Co.	44,460	
L. Littlejohn & Co.	118,690	
The Goodyear Tire & Rubber Co.	143,650	
Fred Stern & Co.	121,940	
East Asiatic Co.	42,250	
Robinson & Co.	36,660	
Meyer & Brown.	31,850	614,310
APRIL 2.—By the *Tenyo Maru* Ex Salamis=Singapore:		
J. T. Johnstone & Co.		88,530
APRIL 6.—By the *Bankoku Maru*=Singapore:		
Meyer & Brown.		49,000
APRIL 7.—By the *Saikai Maru*=Singapore:		
Meyer & Brown.		112,000
APRIL 13.—By the *Kwanto Maru*=Kobe:		
Henderson & Korn.		129,200
APRIL 22.—By the *Talthybius*=Singapore:		
Meyer & Brown.		108,000
J. T. Johnstone & Co.		350,000

CUSTOM HOUSE STATISTICS.

PORT OF BOSTON—MARCH, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	33,358	$9,983
Rubber scrap	11,442	1,062
Manufactures of india rubber	.....	735
Totals	44,800	$11,780
EXPORTS:		
Rubber scrap	160,951	$17,479
India rubber boots.....*pairs*	8,038	19,047
India rubber shoes.....*pairs*	28,002	12,629
Automobile tires	.....	442
Other tires	.....	10
Belting, hose, etc.	.....	780
All other manufactures of india rubber	.....	6,561
Totals	.....	$56,948

PORT OF CLEVELAND—MARCH, 1917.

IMPORTS:	POUNDS.	VALUE.
India rubber	430,934	$268,700
Manufactures of india rubber	.....	223
Totals	430,934	$268,923

PORT OF PHILADELPHIA—MARCH, 1917.

IMPORTS:	POUNDS.	VALUE.
Manufactures of india rubber	.....	$603
EXPORTS:		
All other manufactures of india rubber	.....	$6,615

RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	February, 1917.	
UNMANUFACTURED—*free:*	Pounds.	Value.
India rubber:		
From—		
France	85,759	$46,773
Portugal	586,575	225,813
United Kingdom	4,024,038	2,565,716
Central American States and British Honduras	203,143	92,174
Mexico	111,778	54,227
Brazil	3,983,966	1,771,253
Other South America	332,591	152,374
East Indies	9,948,445	5,672,606
Other countries	48,312	33,659
Totals	19,324,607	$10,614,595
Balata	223,484	103,307
Guayule gum	157,539	42,118
*Gutta jelutong	1,519,602	66,331
Gutta percha	28,365	3,489
Totals	21,253,597	$10,829,840
Rubber scrap	1,645,826	120,489
Totals unmanufactured	22,899,423	$10,950,329
Chicle .....*dutiable*	772,733	384,679
	February, 1917.	
MANUFACTURED—*dutiable:*	Pounds.	Value.
Gutta percha	.....	$27
India rubber	.....	$4,023
Total, manufactured	.....	$54,050
Substitutes—elasticon, etc., *dutiable*	.....	$975

EXPORTS OF DOMESTIC MERCHANDISE.

	February, 1917.	
MANUFACTURED—	Pounds.	Value.
Automobile tires:		
To—		
France	.....	$60,455
Russia in Europe	.....	43,680
England	.....	186,436
Canada	.....	101,437
Mexico	.....	15,851
Cuba	.....	72,331
Australia	.....	62,653
New Zealand	.....	5,734
Philippine Islands	.....	20,340
Other countries	.....	261,785
Total	.....	$830,702
All other tires	.....	140,586
Belting, hose and packing	.....	245,719
Rubber boots .....*pairs*	40,297	96,500
Rubber shoes .....*pairs*	226,395	123,736
Scrap and old rubber	261,092	33,193
Reclaimed rubber	428,286	71,614
Other rubber manufactures	.....	622,575
Total, manufactured	.....	$2,164,265
Fountain pens .....*number*	12,371	$7,258

EXPORTS OF FOREIGN MERCHANDISE.

	February, 1917.	
UNMANUFACTURED—	Pounds.	Value.
Balata	135,238	$74,309
India rubber	737,736	404,887
Rubber scrap and refuse	.....	.....
Totals, unmanufactured.	872,974	$479,196
Chicle	7,755	2,714
MANUFACTURED—		
India rubber	.....	$1,128
Total, manufactured	.....	$1,128

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

	February, 1917.	
MANUFACTURED—	Pounds.	Value.
To—		
Alaska:		
Belting, hose and packing.	.....	$5,931
Boots and shoes.....*pairs*	6,508	11,535
Other rubber goods	.....	2,001
Total	.....	$19,467
To—		
Hawaii:		
Belting, hose and packing.	.....	$6,304
Automobile tires	.....	27,875
Other tires	.....	5,650
Other rubber goods	.....	10,716
Total	.....	$50,545
MANUFACTURED—	February, 1917.	
	Pounds.	Value.
To—		
Philippine Islands:		
Belting, hose and packing.	.....	$1,159
Boots and shoes.....*pairs*	3,533	2,151
Tires	.....	27,116
Other rubber goods	.....	17,830
Total	.....	$48,256
To—		
Porto Rico:		
Belting, hose and packing.	.....	$1,646
Automobile tires	.....	41,656
Other tires	.....	230
Other rubber goods	.....	9,179
Total	.....	$52,711

*Dutiable beginning July 1, 1916.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER AT THE PORT OF NEW YORK.

	March, 1917.	
UNMANUFACTURED—*free:*	Pounds.	Value.
Crude Rubber—		
France	88,050	$46,491
Portugal	908,116	388,620
England	13,868,981	10,074,269
Costa Rica	14,289	8,052
Guatemala	17,409	8,826
Honduras	6,341	2,956
Nicaragua	42,935	21,685
Panama	22,282	7,130
Salvador	9,841	4,919
Mexico	301,959	114,053
Trinidad	879	371
British West Indies	11,221	8,786
Brazil	9,235,209	4,414,468
Colombia	134,943	55,356
Ecuador	86,765	37,539
British Guiana	3,590	1,486
Peru	49,837	25,577
Venezuela	4,314	2,616
Aden	958	479
British India	42,466	26,276
Straits Settlements	2,560,620	1,441,598
British East Indies	952,110	579,335
Dutch East Indies	2,027,911	1,126,636
Philippine Islands	1,667	804
Totals	30,392,693	$18,398,328
Gutta Jelutong—*dutiable:*		
Straits Settlements	204,769	$10,324
Dutch East Indies	143,394	4,791
Totals	348,163	$15,115
Balata—*free:*		
Panama	119,051	$50,088
Trinidad	1,000	500
Colombia	84,631	36,873
British Guiana	7,388	4,744
Dutch Guiana	22,907	12,515
Venezuela	70,651	33,669
Totals	305,628	$138,389
Rubber Scrap—*free:*		
France	272,172	$16,244
England	1,020,584	63,494
Panama	8,118	556
Mexico	6,309	447
Jamaica	5,803	522
Trinidad	1,784	107
British West Indies	1,110	67
Cuba	53,952	3,544
Argentine	188,523	11,874
Australia	41,439	1,366
Totals	1,599,794	$98,221
Totals unmanufactured	32,646,278	$18,650,053
Chicle—*dutigble:*		
British Honduras	256,922	$84,782
Canada	74,914	43,597
Mexico	111,537	38,836
Venezuela	101	23
Totals	443,474	$167,238
MANUFACTURED—*dutiable:*		
India Rubber—		
France	.....	$834
England	.....	35,361
Scotland	.....	964
Canada	.....	5,666
Colombia	.....	1,905
Straits Settlements	.....	5,399
Total	.....	$50,129
Gutta Percha—		
Scotland	.....	$18,785
Totals, manufactured	.....	$68,914

Official India Rubber Statistics for the United States.

Fiscal Year Ended June 30, 1916.

INDIA RUBBER.

IMPORTS OF CRUDE INDIA RUBBER BY COUNTRIES (FREE).

From—	Pounds.	Value.
EUROPE—		
France	509,675	$312,144
Netherlands	479,382	363,826
Portugal	2,773,656	1,094,841
United Kingdom—		
England	72,459,408	48,144,416
Totals, Europe	76,222,121	$49,915,227
NORTH AMERICA—		
Canada	9,040	$5,402
Central American States—		
Costa Rica	156,158	74,978
Guatemala	122,061	60,036
Honduras	87,347	36,753
Nicaragua	647,434	305,153
Panama	234,336	89,292
Salvador	66,118	30,615
Mexico	3,261,507	1,262,291
West Indies—		
British—		
Trin. and Tobago	5,311	2,139
Haiti	730	469
Totals, North America	4,590,042	$1,867,128
SOUTH AMERICA—		
Argentina	190,990	$100,812
Brazil	54,968,227	25,150,493
Chile	221,593	114,854
Colombia	750,126	327,023
Ecuador	661,443	274,924
Guiana—		
British	16,392	7,041
Dutch	101,668	41,212
Peru	3,476,294	1,702,581
Uruguay	50,817	28,249
Venezuela	796,064	300,017
Totals, South America	61,233,614	$28,047,206
ASIA—		
China	2,600	$1,170
East Indies—		
British—		
British India	136,071	74,883
Straits Settlements	78,891,429	47,092,914
Other British	26,212,604	16,319,352
Dutch	20,291,963	11,605,793
Japan	160,789	101,017
Totals, Asia	125,695,456	$75,195,129
OCEANIA—		
Philippine Islands	26,564	$13,439
AFRICA—		
French Africa	7,760	$6,661
Totals, 1915-16	267,775,557	$155,044,790
Totals, 1914-15	172,068,428	83,030,269
Totals, 1913-14	131,995,742	71,219,851
Totals, 1912-13	113,384,359	90,170,316
Totals, 1911-12	110,210,173	93,013,255
Totals, 1910-11	72,046,260	76,244,603
Totals, 1909-10	101,044,681	101,078,825
Totals, 1908-09	88,359,895	61,709,723
Totals, 1907-08	62,233,160	36,613,185
Totals, 1906-07	76,963,838	58,919,981
Totals, 1905-06	57,844,345	45,114,450

IMPORTS OF CRUDE INDIA RUBBER, BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Massachusetts	1,222,169	$755,893
New York	236,055,345	135,549,484
Philadelphia	10,582	18,227
Virginia	7,760	6,661
Florida	839	302
New Orleans	2,415,965	889,588
San Francisco	4,875,373	2,909,348
Southern California	10,182	2,399
Washington	15,147,721	10,475,081
Buffalo	2,340	1,148
Dakota	2,662,578	1,392,947
Ohio	5,364,683	3,043,700
St. Lawrence	20	12
Totals, 1915-16	267,775,557	$155,044,790

IMPORTS OF MANUFACTURES OF INDIA RUBBER, BY COUNTRIES (DUTIABLE).

[+ indicates increase; — indicates decrease, compared with the preceding year.]

From—	Value.
EUROPE:	
Austria-Hungary	$9—
Belgium	366—
France	13,263—
Germany	1,695—
Italy	3,906—
Netherlands	284—
Norway	135—
Russia in Europe	10—
Spain	46+
Sweden	9—
Switzerland	41+
United Kingdom—	
England	227,589—
Scotland	27,749+
Ireland	191+
Totals, Europe	$275,293
NORTH AMERICA:	
Canada	$106,838+
Mexico	12—
West Indies—	
Cuba	492+
Dominican Republic	110+
Totals, North America	$107,452
ASIA:	
China	$5+
Japan	13,618+
Totals, Asia	$13,623
OCEANIA:	
Australia	$14—
New Zealand	35—
Totals, Oceania	$49
AFRICA:	
British South Africa	$1,603+
Totals, 1915-16	$398,020
Totals, 1914-15	791,281
Totals, 1913-14	1,517,789
Totals, 1912-13	1,217,236
Totals, 1911-12	874,736
Totals, 1910-11	875,125
Totals, 1909-10	1,154,347
Totals, 1908-09	1,391,770
Totals, 1907-08	1,956,590
Totals, 1906-07	2,262,783
Totals, 1905-06	1,992,413

IMPORTS OF MANUFACTURES OF INDIA RUBBER, BY CUSTOMS DISTRICTS (DUTIABLE).

At—	Value.
Connecticut	$20
Georgia	43
Maine and New Hampshire	413
Maryland	784
Massachusetts	43,295
New York	288,474
Philadelphia	7,466
Porto Rico	51
Rhode Island	822
Virginia	587
Galveston	23
New Orleans	67
El Paso	12
Alaska	5
Hawaii	534
San Francisco	2,622
Southern California	2
Washington	1,544
Buffalo	511
Chicago	5,263
Dakota	85
Michigan	24,314
Montana and Idaho	384
Ohio	11,480
Rochester	239
St. Lawrence	492
Vermont	336
Wisconsin	2,801
Iowa	125
Minnesota	794
Pittsburgh	2,522
St. Louis	1,910
Total, 1915-16	$398,020

RE-EXPORTS OF IMPORTED CRUDE INDIA RUBBER.

To—	Pounds.	Value.
France	23,693	$14,690
Russia in Europe	289,219	147,567
United Kingdom-England	100,945	47,015
Canada	4,226,404	2,435,285
British Oceania-Australia	22,628	16,744
Totals, 1915-16	4,662,889	$2,661,331
Totals, 1914-15	6,383,145	3,361,107
Totals, 1913-14	3,747,749	2,398,150
Totals, 1912-13	5,272,387	4,476,379
Totals, 1911-12	5,610,951	4,890,905
Totals, 1910-11	5,267,588	5,439,282
Totals, 1909-10	6,492,947	7,629,380
Totals, 1908-09	3,791,971	2,964,496
Totals, 1907-08	4,110,667	2,994,208
Totals, 1906-07	4,215,350	3,593,912

RE-EXPORTS OF MANUFACTURES OF INDIA RUBBER.

To—	Value.
United Kingdom-England	$2,936
Canada	19,971
Mexico	14,693
Newfoundland and Labrador	95
West Indies—Cuba	521
Colombia	70
Venezuela	53
Japan	310
Totals, 1915-16	$38,649
Total, 1914-15	7,489
Total, 1913-14	7,638
Total, 1912-13	7,973
Total, 1911-12	6,681
Total, 1910-11	29,356
Total, 1909-10	13,568
Total, 1908-09	36,401
Total, 1907-08	176,129
Total, 1906-07	32,712

GUTTA PERCHA.

IMPORTS OF CRUDE GUTTA PERCHA, BY COUNTRIES (FREE).

From—	Pounds.	Value.
EUROPE:		
France	6,785	$8,680
United Kingdom—		
England	56,419	11,972
Scotland	11,305	1,046
Totals, Europe	74,509	$21,698
SOUTH AMERICA:		
Colombia	696	190
ASIA:		
British East Indies—		
Straits Settlements	2,984,984	$299,150
Dutch East Indies	71,420	7,170
Siam	360	52
Totals, Asia	3,056,764	$306,372
OCEANIA:		
Philippine Islands	16,384	$4,744
AFRICA:		
British West Africa	40,096	$9,222
Totals, 1915-16	3,188,449	$342,226
Totals, 1914-15	1,618,214	230,750
Totals, 1913-14	1,846,109	323,567
Totals, 1912-13	480,853	167,313
Totals, 1911-12	1,204,406	225,797
Totals, 1910-11	1,648,921	390,548
Totals, 1909-10	784,501	167,873
Totals, 1908-09	255,559	82,136
Totals, 1907-08	188,610	100,305
Totals, 1906-07	546,890	201,339
Totals, 1905-06	500,770	188,161

IMPORTS OF CRUDE GUTTA PERCHA, BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Massachusetts	555,625	$53,268
New York	2,218,177	239,708
San Francisco	22,831	1,793
Washington	391,816	47,457
Totals	3,188,449	$342,226

IMPORTS OF MANUFACTURES OF GUTTA PERCHA, BY COUNTRIES (DUTIABLE).

From—	Value.
EUROPE:	
United Kingdom—	
England	$47,900
Scotland	8,797
Total, Europe	$56,697
NORTH AMERICA:	
Canada	$128
Mexico	35
Totals, North America	$163
ASIA:	
Japan	$1,015
Total, 1915-16	$57,875
Total, 1914-15	$10,841
Total, 1913-14	42,023
Total, 1912-13	77,300
Total, 1911-12	41,098
Total, 1910-11	61,283
Total, 1909-10	80,567
Total, 1908-09	71,819
Total, 1907-08	93,545

IMPORTS OF MANUFACTURED GUTTA PERCHA BY CUSTOMS DISTRICTS (DUTIABLE).

At—	Value.
Connecticut	$69
Georgia	6
New York	55,853
Arizona	35
Hawaii	75
San Francisco	739
Southern California	130
Washington	318
Buffalo	70
Chicago	276
Duluth and Superior	10
Rochester	18
St. Lawrence	54
Vermont	34
Kentucky	188
Total	$57,875

RE-EXPORTS OF CRUDE GUTTA PERCHA.

To—	Pounds.	Value.
Italy	814	$569
United Kingdom—		
England	13,645	1,600
Canada	45,431	9,207
Argentina	133	70
Totals, 1915-16	60,023	$11,446
Totals, 1914-15	9,457	4,603
Totals, 1913-14	14,649	5,255
Totals, 1912-13	22,352	2,665
Totals, 1911-12	1,011	945
Totals, 1910-11	62,391	19,235
Totals, 1909-10	74,137	13,886
Totals, 1908-09	9,370	3,730
Totals, 1907-08	.....	.....
Totals, 1906-07	5,000	700

RE-EXPORTS OF MANUFACTURES OF GUTTA PERCHA.

To—	Value.
Canada	$30
Newfoundland and Labrador	25
West Indies—	
British, Jamaica	19
Cuba	297
British Oceania—	
New Zealand	166
Total, 1915-16	$537
Total, 1914-15	—
Total, 1913-14	—
Total, 1912-13	—
Total, 1911-12	65
Total, 1910-11	8687

GUAYULE.

IMPORTS OF GUAYULE, BY COUNTRIES (FREE).

From—	Pounds.	Value.
Mexico	2,816,068	$880,813
Totals, 1915-16	2,816,068	$880,813
Totals, 1914-15	5,111,849	$1,441,367
Totals, 1913-14	1,475,804	607,076
Totals, 1912-13	10,218,191	4,345,088
Totals, 1911-12	14,238,625	6,463,787
Totals, 1910-11	19,749,522	10,443,157

IMPORTS OF GUAYULE GUM, BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Sabine	1,764	$1,499
Eagle Pass	1,005,672	268,260
El Paso	1,472,791	425,912
Laredo	335,841	185,142
Totals	2,816,068	$880,813

RE-EXPORTS OF GUAYULE GUM.

To—	Pounds.	Value.
Canada	18,500	$7,770
Totals, 1915-16	18,500	$7,770
Totals, 1914-15	29,891	$8,901
Totals, 1913-14	56,399	22,378
Totals, 1912-13	83,769	54,669
Totals, 1911-12	197,948	98,517
Totals, 1910-11	340,405	175,995

(Not reported until 1910-11.)

GUTTA JELUTONG.

IMPORTS OF GUTTA JELUTONG (PONTIANAK), BY COUNTRIES (FREE).

From—	Pounds.	Value.
EUROPE:		
Netherlands	76,460	$3,630
United Kingdom—		
England	22,745	1,593
Totals, Europe	99,205	$5,223
ASIA:		
British East Indies—		
Straits Settlements	25,596,455	$1,223,101
Dutch East Indies	2,162,675	93,938
Totals, Asia	27,759,130	$1,317,039
Totals, 1915-16	27,858,335	$1,322,262
Totals, 1914-15	14,851,264	$731,995
Totals, 1913-14	24,926,571	1,155,402
Totals, 1912-13	45,345,338	2,174,441
Totals, 1911-12	48,795,268	2,255,050
Totals, 1910-11	51,420,872	2,872,633
Totals, 1909-10	52,392,444	2,419,223
Totals, 1908-09	24,826,296	852,372
Totals, 1907-08	22,803,303	1,039,776
Totals, 1906-07	28,437,660	1,085,098
Totals, 1905-06	21,390,116	733,074
Totals, 1904-05	19,104,911	641,319
Totals, 1903-04	14,887,416	430,231
Totals, 1902-03	13,984,817	345,431
Totals, 1901-02	16,850,821	501,418
Totals, 1900-01	9,371,087	248,838
Totals, 1899-00	8,701,753	237,214
Totals, 1898-99	6,473,882	166,419

IMPORTS OF GUTTA JELUTONG (PONTIANAK), BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Massachusetts	3,599,307	$156,497
New York	18,055,160	834,442
San Francisco	195,252	11,897
Washington	6,008,616	319,426
Totals, 1915-16	27,858,335	$1,322,262

RE-EXPORTS OF GUTTA JELUTONG (PONTIANAK).

To—	Pounds.	Value.
United Kingdom—		
England	58,611	$2,807
West Indies—		
Cuba	162	18
Totals, 1915-16	58,773	$2,825
Totals, 1914-15	.....	.....
Totals, 1913-14	32,000	$2,000
Totals, 1912-13	3,000	163
Totals, 1911-12	118,486	6,079
Totals, 1910-11	.....	.....
Totals, 1909-10	2,139	112

BALATA.

IMPORTS OF BALATA, BY COUNTRIES (FREE).

From—	Pounds.	Value.
NORTH AMERICA:		
Central American States—		
Panama	1,117,852	$363,293
West Indies—		
British—		
Jamaica	16,016	8,922
Trinidad and Tobago	16,569	10,107
Haiti	5,626	$2,561
Totals, North America	1,156,063	$384,883
SOUTH AMERICA:		
Brazil	16,036	$5,582
Colombia	106,727	39,206
Ecuador	4,500	1,850
Guiana—		
British	238,565	121,532
Dutch	340,509	189,385
French	42,501	18,600
Venezuela	639,504	235,064
Totals, South America	1,388,342	$611,219
Totals, 1915-16	2,544,405	$996,102
Totals, 1914-15	2,472,224	963,384
Totals, 1913-14	1,533,024	793,126
Totals, 1912-13	1,318,598	766,772
Totals, 1911-12	1,517,066	984,012
Totals, 1910-11	878,305	624,702
Totals, 1909-10	399,003	196,878
Totals, 1908-09	1,157,018	522,872
Totals, 1907-08	584,582	276,756
Totals, 1906-07	799,029	305,041
Totals, 1905-06	374,220	152,689

IMPORTS OF BALATA, BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
New York	2,544,405	$996,102

RE-EXPORTS OF BALATA.

To—	Pounds.	Value.
United Kingdom—		
England	660,866	$240,936
Canada	1,612	1,010
Central American States—		
Panama	300	90
British Oceania—		
Australia	4,390	3,293
Totals, 1915-16	667,168	$245,329
Totals, 1914-15	1,076,619	$426,735
Totals, 1913-14	223,983	127,139
Totals, 1912-13	118,334	77,963
Totals, 1911-12	62,529	38,423
Totals, 1910-11	264,589	230,575
Totals, 1909-10	.....	42,750
Totals, 1908-09	.....	223,907
Totals, 1907-08	.....	18,741
Totals, 1906-07	.....	12,659

SCRAP RUBBER.

IMPORTS OF SCRAP AND REFUSE RUBBER, BY COUNTRIES (FREE).

From—	Pounds.	Value.
EUROPE:		
Denmark	42,814	$3,040
France	281,519	40,598
Germany	250	31
Greece	44,240	3,991
Italy	463,742	94,534
Norway	520,519	45,792
Sweden	85,147	6,346
United Kingdom—		
England	6,424,308	528,962
Scotland	5,609	134
Totals, Europe	7,868,148	$723,428
NORTH AMERICA:		
Canada	7,627,485	$506,443
Central American States—		
Costa Rica	134	8
Panama	79,312	3,868
Mexico	83,570	4,598
West Indies—		
British—		
Jamaica	11,462	638
Cuba	388,582	20,806
Danish	150	30
Dominican Republic	6,482	318
Totals, North America	8,197,177	$536,709
SOUTH AMERICA:		
Brazil	104,002	$3,791
Venezuela	7,307	284
Totals, South America	111,309	$4,075
ASIA:		
China	18,470	$716
Hongkong	87,895	2,814
Japan	7,314	401
Totals, Asia	113,679	$3,931
OCEANIA:		
British—		
Australia	1,800	$50
New Zealand	79,420	3,707
French	40	3
Totals, Oceania	81,260	$3,760
Totals, 1915-16	16,371,573	$1,271,903
Totals, 1914-15	11,006,928	726,915
Totals, 1913-14	25,958,261	2,063,198
Totals, 1912-13	43,385,456	3,709,238
Totals, 1911-12	26,293,192	2,095,605
Totals, 1910-11	26,948,000	2,334,870
Totals, 1909-10	37,364,671	2,998,697
Totals, 1908-09	20,497,695	1,543,267
Totals, 1907-08	16,331,035	1,496,822
Totals, 1906-07	29,335,193	2,608,987

IMPORTS OF SCRAP AND REFUSE RUBBER BY CUSTOMS DISTRICTS (FREE).

At—	Pounds.	Value.
Maine and N. H.	794,469	$67,239
Maryland	1,541,797	178,812
Massachusetts	674,137	54,018
New York	6,482,423	532,153
Philadelphia	144,043	10,654

At—	Pounds.	Value.
El Paso	1,991	131
Laredo	1,543	42
Alaska	300	15
San Francisco	85,046	4,403
Washington	224,608	12,273
Buffalo	2,437,123	157,292
Chicago	556,512	32,160
Dakota	200,797	9,864
Michigan	356,731	29,272
Ohio	60,464	418
St. Lawrence	719,922	38,363
Vermont	1,978,883	138,450
St. Louis	110,784	6,344
Totals, 1915-16	16,371,573	$1,271,903

EXPORTS OF SCRAP AND REFUSE RUBBER BY COUNTRIES.

To—	Pounds.	Value.
EUROPE:		
France	83,119	$12,494
Sweden	45,079	10,204
United Kingdom—		
England	1,362,622	181,522
Scotland	835,524	105,914
Totals, Europe	2,326,344	$310,134
NORTH AMERICA:		
Canada	1,393,550	$69,502
Central American States—		
Panama	190	22
Salvador	279	42
Mexico	600	58
West Indies—		
Cuba	25,024	3,586
Dutch	60	9
Totals, North America	1,419,703	$73,219
SOUTH AMERICA:		
Ecuador	4,000	$470
ASIA:		
East Indies—British—		
British India	33,600	$1,344
Japan	121,068	14,981
Totals, Asia	154,668	$16,325
Totals, 1915-16	3,904,715	$400,148
Totals, 1914-15	2,422,091	291,421
Totals, 1913-14	6,207,672	598,287
Totals, 1912-13	7,269,465	880,442
Totals, 1911-12	7,336,984	780,188
Totals, 1910-11	7,049,729	723,664
Totals, 1909-10	6,143,610	578,944
Totals, 1908-09	4,071,795	402,897
Totals, 1907-08	4,255,789	449,727
Totals, 1906-07	4,756,621	548,695
Totals, 1905-06	a	339,507
Totals, 1904-05	a	204,945

(a) Not officially reported.

EXPORTS OF SCRAP AND REFUSE RUBBER BY CUSTOMS DISTRICTS.

From—	Pounds.	Value.
Maine and New Hampshire	7,145	$4,905
Maryland	40,965	3,300
Massachusetts	62,065	7,943
New York	2,303,630	305,682
Philadelphia	12,031	1,950
New Orleans	600	58
San Francisco	92,030	11,743
Buffalo	450,922	28,908
Michigan	292,493	18,150
St. Lawrence	23,935	556
Vermont	618,899	16,953
Totals, 1915-16	3,904,715	$400,148

RE-EXPORTS OF SCRAP RUBBER.

To—	Pounds.	Value.
Canada	9,204	$734
Totals, 1915-16	9,204	$734
Totals, 1914-15	3,483	373
Totals, 1913-14	24,295	2,450
Totals, 1912-13	87,930	10,723
Totals, 1911-12	302,105	28,196
Totals, 1910-11	401,231	43,338
Totals, 1909-10	61,395	5,373
Totals, 1908-09	38,506	2,093
Totals, 1907-08	21,713	2,943
Totals, 1906-07	105,463	9,444

RECLAIMED RUBBER.

EXPORTS OF RECLAIMED RUBBER BY COUNTRIES.

To—	Pounds.	Value.
EUROPE:		
Denmark	3,000	$317
France	343,466	42,965
Italy	524	83
United Kingdom—		
England	852,091	127,757
Scotland	126,065	19,788
Totals, Europe	1,325,146	$190,910
NORTH AMERICA:		
Canada	4,921,584	$659,589
Mexico	1,224	152
West Indies—		
British—Barbados	200	54
Cuba	723	159
Totals, North America	4,923,731	$659,954
SOUTH AMERICA:		
Argentina	28,147	4,642
To—		
ASIA:		
Japan	84,719	$10,659

OCEANIA:	Pounds.	Value.
Australia	45,203	$5,097
Totals, 1915-16	6,406,946	$871,262
Totals, 1914-15	5,970,380	822,561
Totals, 1913-14	5,583,860	834,440
Totals, 1912-13	5,413,247	932,904
Totals, 1911-12	5,397,806	875,501
Totals, 1910-11	4,994,527	781,650
Totals, 1909-10	3,622,556	535,795
Totals, 1908-09	3,196,551	414,861
Totals, 1907-08	2,947,974	418,738
Totals, 1906-07	4,550,788	665,109
Totals, 1905-06	4,084,696	$11,843
Totals, 1904-05	a	$22,902

(a) Not officially reported.

EXPORTS OF RECLAIMED RUBBER BY CUSTOMS DISTRICTS.

From—	Pounds.	Value.
Massachusetts	123,125	$19,200
New York	1,317,034	187,376
San Francisco	45,203	5,097
Buffalo	1,645,343	223,624
Michigan	308,829	38,111
Ohio	85,425	6,012
St. Lawrence	443,499	63,097
Vermont	2,438,488	328,745
Totals	6,406,946	$871,262

SUBSTITUTES, ELASTICON, ETC.

IMPORTS OF ELASTICON AND SIMILAR SUBSTITUTES FOR INDIA RUBBER BY COUNTRIES (DUTIABLE).

From—	Value.
EUROPE:	
France	$92
Germany	38
England	15,860
Total, Europe	$15,990
ASIA:	
Japan	$189
Total, 1915-16	$16,179
Total, 1914-15	30,349
Total, 1913-14	87,642
Total, 1912-13	97,452
Total, 1911-12	87,328
Total, 1910-11	115,601
Total, 1909-10	114,516
Total, 1908-09	60,625
Total, 1907-08	27,000

IMPORTS OF ELASTICON AND SIMILAR SUBSTITUTES FOR INDIA RUBBER BY CUSTOMS DISTRICTS (DUTIABLE).

At—	Value.
Massachusetts	$3,153
New York	13,026
Total, 1915-16	$16,179

EXPORTS OF AMERICAN RUBBER GOODS, FISCAL YEAR ENDED JUNE 30, 1916. (BY CUSTOMS DISTRICTS.)

EXPORTED FROM—	Belting, Hose and Packing. Value.	Boots. Pairs.	Boots. Value.	Shoes. Pairs.	Shoes. Value.	Tires. Automobile Value.	Tires. Other Value.	Other Goods Value.	Total Value.
Georgia	$295	.....	.....	.....	.....	$147	.....	.....	$442
Maine and New Hampshire	5,997	3,470	$8,904	2,213	$1,773	1,758	$564	$22,914	41,910
Maryland	14,444	.....	.....	.....	.....	189,476	625	4,947	209,492
Massachusetts	205,256	276,274	587,046	852,955	363,890	1,329,907	819	739,632	3,226,550
New York	1,967,531	392,836	890,194	982,593	573,148	11,442,571	2,779,134	4,629,048	22,281,626
Philadelphia	52,699	.....	.....	.....	.....	331,336	374	82,353	466,762
Porto Rico	11	.....	.....	.....	.....	459	14	46	530
Rhode Island	.....	.....	.....	.....	.....	.....	3	.....	3
Virginia	12,273	43	331	.....	.....	686,517	17,695	20,172	736,988
Florida	2,506	1	4	596	433	21,994	.....	1,026	25,963
Galveston	1,259	.....	.....	.....	.....	1,186	.....	362	2,807
Mobile	.....	.....	.....	124	82	3,451	.....	.....	3,533
New Orleans	19,174	73	53	1,034	873	11,125	998	11,458	43,681
Sabine	1,388	.....	.....	.....	.....	727	.....	151	2,266
Arizona	33,590	26	137	371	266	10,308	783	5,579	50,663
Eagle Pass	2,417	.....	.....	.....	.....	5,378	225	652	8,672
El Paso	18,476	.....	.....	.....	.....	10,395	365	3,310	32,546
Laredo	21,380	.....	.....	66	47	50,885	2,902	2,597	77,811
Alaska	15,582	3,033	11,429	1,246	2,953	3,176	18	572	33,730
Hawaii	.....	.....	.....	.....	.....	98	.....	8	106
Oregon	.....	.....	.....	.....	.....	450	.....	.....	450
San Francisco	300,709	3,393	14,019	52,638	43,586	1,857,589	165,202	167,592	2,548,697
Southern California	1,682	3	15	82	28	8,401	.....	604	10,730
Washington	54,431	1,414	6,142	24,721	19,418	189,991	7,633	89,375	366,990
Buffalo	113,116	3,175	8,447	2,723	1,265	406,926	16,051	678,199	1,224,004
Dakota	38,280	3,490	10,123	2,971	2,033	657,701	546	72,671	781,354
Duluth and Superior	9,240	7	31	960	1,691	3,487	835	25,937	41,221
Michigan	20,961	25,640	62,892	4,245	5,259	583,227	6,843	82,936	762,118
Montana and Idaho	690	2	6	15	12	883	.....	1,254	2,845
Ohio	15	.....	.....	.....	.....	.....	.....	137	152
Rochester	130	.....	.....	.....	.....	.....	.....	.....	130
St. Lawrence	43,362	142	580	69	32	113,683	1,381	223,048	382,086
Vermont	30,059	7,108	18,907	47,274	29,313	12,995	67	423,765	515,106
Totals	$2,986,953	720,130	$1,619,260	1,976,896	$1,046,102	$17,936,227	$3,003,077	$7,290,345	$33,881,964

EXPORTS OF AMERICAN RUBBER GOODS, FISCAL YEAR ENDED JUNE 30, 1916. (BY COUNTRIES.)

EXPORTED TO—	Belting, Hose and Packing. Value.	Boots. Pairs.	Boots. Value.	Shoes. Pairs.	Shoes. Value.	Tires. Automobile Value.	Tires. Other Value.	Other Goods Value.	Total Value.
Austria-Hungary	.....	.....	.....	.....	.....	.....	.....	$36	$36
Azores and Madeira Islands	$29	.....	.....	.....	.....	$373	.....	859	1,261
Denmark	2,807	.....	.....	6,801	$4,044	16,089	$12,093	12,787	47,820
Finland	976	.....	.....	.....	.....	.....	.....	43	1,019
France	35,746	60,418	$132,203	148,585	71,448	80,423	163,818	522,757	1,006,395
Germany	.....	.....	.....	.....	.....	.....	.....	120	120
Gibraltar	.....	.....	.....	.....	.....	.....	.....	48	48
Greece	6,278	.....	.....	.....	.....	698	1,018	4,880	13,874
Iceland and Faroe Islands	.....	.....	.....	.....	.....	.....	.....	106	106
Italy	11,555	1,131	2,496	46,993	30,935	333,437	411,666	118,922	909,011
Netherlands	4,593	.....	.....	4,590	1,768	36,548	10,851	27,890	81,650
Norway	10,250	.....	.....	74,139	35,200	10,001	11,672	12,089	79,212
Portugal	2,207	20	63	.....	.....	25,990	930	4,267	33,457
Roumania	.....	.....	.....	.....	.....	576	.....	900	1,476
Russia in Europe	4,845	.....	.....	.....	.....	1,125,733	28,313	20,416	1,179,307
Spain	113	643	1,897	.....	.....	32,984	5,946	25,350	66,290
Sweden	4,164	.....	.....	75	303	35,850	23,235	19,018	82,570
Switzerland	.....	.....	.....	8,762	3,466	.....	.....	2,815	6,281
United Kingdom—									
England	814,900	569,907	1,248,116	1,068,429	527,452	9,175,248	1,306,699	3,165,609	16,238,024
Scotland	37,757	96	161	57,565	20,473	116,858	15,331	31,771	222,351
Ireland	.....	.....	.....	.....	.....	1,376	.....	567	1,943
Totals, Europe	$936,220	632,215	$1,384,936	1,415,939	$695,089	$10,992,184	$1,991,572	$3,971,250	$19,971,251
NORTH AMERICA:									
Bermuda	$682	.....	.....	1,355	$797	$1,440	$1,364	$2,693	$6,976
British Honduras	468	65	$26	522	432	36	64	1,225	2,251
Canada	279,342	32,842	91,601	34,729	26,458	1,176,836	30,487	1,353,094	3,157,818
Central American States—									
Costa Rica	5,605	.....	.....	40	24	6,068	3,832	6,076	21,605
Guatemala	4,544	.....	.....	250	117	6,299	2,553	6,411	19,924
Honduras	7,612	.....	.....	386	313	7,932	2,624	8,229	26,710
Nicaragua	9,338	18	55	162	80	157	20	8,741	18,391
Panama	116,083	952	2,621	15,287	8,900	73,854	9,594	45,387	256,439
Salvador	12,754	.....	.....	96	94	11,673	3,205	20,367	48,093
Mexico	193,470	145	473	1,366	895	236,811	33,696	61,082	526,427
Miquelon, Langley, etc.	40	1,683	3,985	2,890	1,303	.....	.....	185	5,513
Newfoundland and Labrador	5,121	23,436	54,716	86,681	60,415	5,108	4,118	21,252	150,730
West Indies—British—									
Barbados	331	.....	.....	36	55	6,019	1,121	3,691	11,217
Jamaica	8,849	10	22	434	220	40,354	19,380	6,795	75,620
Trinidad and Tobago	7,192	.....	.....	448	169	30,510	5,235	7,482	50,588
Other British	2,600	.....	.....	1,249	819	8,337	2,500	3,127	17,383
Cuba 6	171,456	699	1,346	16,425	11,691	547,410	139,892	336,483	1,208,278
Danish	362	.....	.....	82	74	1,099	80	623	2,238
Dominican Republic	7,189	26	71	672	420	18,223	4,630	10,587	41,120
Dutch	2,400	.....	.....	62	38	4,437	386	878	8,139
French	134	1	4	17	14	1,283	388	916	2,739
Haiti	1,575	1	3	45	37	988	664	2,707	5,974
Totals, North America	$837,147	59,878	$154,923	163,234	$113,365	$2,184,874	$265,833	$2,108,031	$5,664,173
SOUTH AMERICA:									
Argentine	$74,666	206	$494	7,201	$4,266	$488,329	$97,793	$206,315	$871,863
Bolivia	4,568	.....	.....	.....	.....	4,954	17	16,417	25,956
Brazil	67,339	366	1,242	25,535	13,134	295,479	113,073	199,889	690,156
Chile	175,879	4,077	9,410	19,534	11,036	58,809	34,751	73,631	363,516
Colombia	10,612	17	43	2,283	1,175	28,617	7,614	27,157	75,218
Ecuador	6,214	84	243	1,135	451	9,225	3,486	8,594	28,213
Guiana—									
British	2,574	.....	.....	4,906	2,057	5,512	1,305	1,829	13,277
Dutch	1,155	.....	.....	276	132	1,339	371	908	3,905
French	143	.....	.....	96	68	14	.....	.....	225
Paraguay	.....	.....	.....	.....	.....	.....	.....	44	44
Peru	38,871	1,428	4,754	360	225	9,663	2,082	19,224	74,819
Uruguay	11,995	80	147	13,942	7,605	76,608	26,217	34,923	157,495
Venezuela	8,716	.....	.....	570	312	71,849	7,207	27,960	116,044
Totals, South America	$402,732	6,258	$16,333	75,838	$40,461	$1,050,398	$293,916	$616,891	$2,420,731
ASIA:									
Aden	.....	.....	.....	.....	.....	$1,585	.....	.....	$1,585
China	$16,670	205	$649	2,413	$1,827	41,298	$5,385	$16,991	82,820
China, leased territories—									
French	.....	.....	.....	.....	.....	999	.....	4	1,003
Japanese	96	.....	.....	.....	.....	.....	.....	.....	96
Chosen	5,161	4	29	132	129	4,330	.....	219	9,868
East Indies—British—									
British India	4,818	370	830	530	635	119,242	21,180	27,854	174,559
Straits Settlements	2,739	.....	.....	1,248	628	63,572	1,498	3,551	71,988
Other British	660	.....	.....	70	83	19,012	312	474	20,541
East Indies—Dutch	8,320	290	620	930	655	201,287	20,756	28,962	260,600
Hongkong	5,032	26	75	964	1,816	4,189	2,058	3,943	17,113
Japan	99,734	1,147	2,325	28,763	19,456	20,045	2,478	106,188	250,226
Russia in Asia	20,351	326	1,631	274	331	100	.....	5,640	28,053
Siam	.....	.....	.....	.....	.....	2,236	239	622	3,097
Totals, Asia	$163,581	2,368	$6,159	35,324	$25,560	$477,895	$53,906	$194,448	$921,549
OCEANIA:									
British Oceania—									
Australia	$140,715	7,071	$19,884	175,529	$88,296	$1,551,154	$81,736	$147,453	$2,029,238
New Zealand	39,447	9,609	29,048	18,237	13,460	944,008	49,223	86,223	1,161,409
Other British	.....	7	42	5,148	4,946	574	.....	57	5,619
French Oceania	1,941	.....	.....	9,191	7,318	8,990	1,163	971	20,383
German Oceania	143	.....	.....	.....	.....	41	136	14	334
Philippine Islands	57,686	451	1,226	67,264	49,323	391,634	146,777	103,662	750,308
Totals, Oceania	$239,932	17,138	$50,200	275,369	$163,343	$2,896,401	$279,035	$338,380	$3,967,291

EXPORTED TO—	Belting, Hose and Packing. Value.	Boots. Pairs.	Boots. Value.	Shoes. Pairs.	Shoes. Value.	Tires. Automobile, Value.	Tires. Other, Value.	Other Goods, Value.	Total Value.
EUROPE:									
AFRICA:									
Belgian Congo	.....	.....	.....	.....	.....	$17	$15	$313	$345
British Africa—									
West	$1,132	.....	.....	224	$234	27,301	678	116	29,461
South	376,885	2,153	$6,275	10,968	8,050	291,318	116,391	56,420	855,339
East	1,143	.....	.....	.....	.....	9,732	.....	.....	10,875
Canary Islands	23	.....	.....	.....	.....	1,777	83	144	2,027
Egypt	219	.....	.....	.....	.....	532	1,474	1,095	3,320
French Africa	.....	.....	.....	.....	.....	.....	95	.....	95
Liberia	.....	.....	.....	.....	.....	.....	.....	5	5
Madagascar	.....	.....	.....	.....	.....	197	.....	.....	197
Morocco	.....	.....	.....	.....	.....	.....	.....	8	8
Portuguese Africa	27,939	120	434	.....	.....	3,601	.....	3,243	35,217
Spanish Africa	.....	.....	.....	.....	.....	.....	79	1	80
Totals, Africa	$407,341	2,273	$6,709	11,192	$8,284	$334,475	$118,815	$61,345	$936,969
Grand totals, 1915-16	$2,986,953	720,130	$1,619,260	1,976,896	$1,046,102	$17,936,227	$3,003,077	$7,290,345	$33,881,964
Grand totals, 1914-15	1,807,848	318,727	726,765	2,219,900	2,053,560	4,963,270	576,602	3,525,486	13,653,531
Grand totals, 1913-14	2,372,887	101,361	279,206	1,634,258	834,289	3,505,267	563,372	3,453,472	11,008,493
Grand totals, 1912-13	2,605,551	109,528	274,330	2,231,467	1,163,953	3,943,220	611,458	3,913,036	12,511,548
		Boots and Shoes.[1]							
		Pairs.	Value.						
Grand totals, 1911-12	$2,315,484	.....	2,545,076	$1,302,890	.....	2,657,809	546,833	4,144,273	11,167,289
Grand totals, 1910-11	2,163,416	.....	3,984,332	2,219,430	.....	2,085,107[2]	592,470	3,886,825	10,947,248
Grand totals, 1909-10	1,960,825	.....	3,791,084	1,984,739	.....	.....	.....	5,115,331	9,060,895
Grand totals, 1908-09	1,498,445	.....	2,396,435	1,292,673	.....	.....	.....	3,823,956	6,615,074
Grand totals, 1907-08	1,347,775	.....	3,080,253	1,614,290	.....	.....	.....	3,743,040	6,705,105
Grand totals, 1906-07	1,253,369	.....	2,310,420	1,231,898	.....	.....	.....	3,729,643	6,214,910
Grand totals, 1905-06	1,221,159	.....	2,693,690	1,505,082	.....	.....	.....	2,966,144	5,692,385
Grand totals, 1904-05	994,100	.....	2,390,539	1,214,342	.....	.....	.....	2,572,375	4,780,817
Grand totals, 1903-04	880,010	.....	2,310,420	1,231,898	.....	.....	.....	3,729,643	6,214,910
Grand totals, 1902-03	819,985	.....	2,307,401	1,056,491	.....	.....	.....	2,299,875	4,176,351
Grand totals, 1901-02	634,146	.....	2,594,708	1,046,315	.....	.....	.....	1,781,941	3,462,402
Grand totals, 1900-01	565,726	.....	1,459,100	724,015	.....	.....	.....	1,727,527	3,017,268

[1] Stated separately after 1912. [2] Tires were not specifically reported before 1910-11.

SUMMARY.

	1913-14. Pounds.	1913-14. Value.	1914-15. Pounds.	1914-15. Value.	1915-16. Pounds.	1915-16. Value.
IMPORTS OF FOREIGN MERCHANDISE—						
India rubber, etc., and substitutes for, and manufactures of:						
Unmanufactured—(*free*):						
Balata	1,533,024	$793,126	2,472,224	$963,384	2,544,405	$996,102
Guayule gum	1,475,804	607,076	5,111,849	1,441,367	2,816,068	880,813
Gutta jelutong	24,926,571	1,155,402	14,851,264	731,995	27,858,335	1,322,262
Gutta percha	1,846,109	323,567	1,618,214	230,750	3,188,449	342,226
India rubber	131,995,742	71,219,851	172,068,428	83,030,269	267,775,557	155,044,790
India rubber scrap or refuse, fit only for remanufacture	25,958,261	2,063,198	11,006,928	726,915	16,371,573	1,271,903
Total unmanufactured imports	187,735,511	$76,162,220	207,128,907	$87,124,680	320,554,387	$159,858,096
Manufactures of—(*dutiable*):						
Gutta percha	.....	$42,023	.....	$10,841	.....	$57,875
India rubber	.....	1,517,789	.....	791,281	.....	398,020
Substitutes, elasticon and similar	.....	87,642	.....	30,349	.....	16,179
Total manufactured imports	.....	$1,647,454	.....	$832,471	.....	$472,074
RE-EXPORTS OF FOREIGN MERCHANDISE—						
India rubber, etc., and substitutes for, and manufactures of:						
Unmanufactured—(*free*):						
Balata	223,983	$127,139	1,076,619	$426,735	667,168	$245,329
Guayule gum	56,399	22,378	29,891	8,901	18,500	7,770
Gutta jelutong	32,330	2,195	.....	.....	58,773	2,825
Gutta percha	14,319	5,060	9,457	4,603	60,023	11,446
India rubber	3,747,749	2,398,150	6,383,145	3,361,107	4,662,889	2,661,301
India rubber scrap or refuse, fit only for remanufacture	24,316	2,450	3,483	373	9,204	734
Total unmanufactured re-exports	4,099,096	$2,557,372	7,502,595	$3,801,719	5,476,557	$2,929,405
Manufactures of—(*dutiable*):						
Gutta percha	.....	.....	.....	.....	.....	$537
India rubber	.....	$7,638	.....	$7,489	.....	38,649
Substitutes, elasticon and similar	.....	.....	.....	364	.....	.....
Total manufactures re-exported	.....	$7,638	.....	$7,853	.....	$39,186
EXPORTS OF DOMESTIC MANUFACTURES—						
India rubber, manufactures of:						
Scrap and old	6,207,672	$598,287	2,422,091	$291,421	3,904,715	$400,148
Reclaimed	5,583,860	834,440	5,970,380	822,561	6,406,946	871,262
Belting, hose and packing	.....	2,372,887	.....	1,807,848	.....	2,986,953
Boots and shoes—						
Boots (*pairs*)	101,361	279,206	318,727	726,765	720,130	1,619,260
Shoes	1,634,258	834,289	2,219,900	2,053,560	1,976,696	1,046,102
Tires—						
For automobiles	.....	3,505,267	.....	4,963,270	.....	17,936,227
All other	.....	563,372	.....	576,602	.....	3,003,077
All other manufactures of	.....	3,453,472	.....	3,525,486	.....	7,290,345
Total domestic manufactures exported	.....	$12,441,220	.....	$14,767,513	.....	$35,180,096

RUBBER STATISTICS FOR THE UNITED STATES.

For Quarter Ending September 30, 1916.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

July 1 to Sept. 30, 1916.

	Pounds.	Value.
Unmanufactured—*free:*		
Balata, crude	582,273	$271,531
Guayule gum	599,229	160,310
Gutta percha, crude	1,027,055	144,376
India rubber, crude	51,612,637	28,387,499
Scrap rubber	2,571,212	174,091
Reclaimed rubber	255,889	37,932
Totals	56,648,295	$29,175,739

Unmanufactured—*dutiable:*			
Gutta jelutong	10 per cent	6,901,834	302,532
Totals, unmanufactured		63,550,129	$29,478,271
Manufactured—*dutiable:*			
Gutta percha	10 per cent	.....	$105,218
India rubber	10 per cent	.....	105,380
Druggists' sundries	15 per cent	.....	8,947
Hard rubber	25 per cent	.....	3,837
Substitutes, elasticon, etc	15 per cent	.....	8,788
Totals manufactured		.....	$232,170

EXPORTS OF INDIA RUBBER FROM MANAOS DURING FEBRUARY, 1917.

	New York.					Europe.					Grand
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Totals.
General Rubber Co. of Brazil. *kilos*	223,385	35,761	76,454	187,400	523,000	80,205	8,640	100	41,055	130,000	653,000
Tancredo Porto & Co.	153,475	67,095	78,311	31,019	329,900	151,269	10,258	1,477	40,738	203,742	533,642
Adelbert H. Alden, Limited	2,438	37,277	63,208	91	103,014	275,080	119	167	68,755	344,121	447,135
Stowell & Co.	95,306	8,095	49,979	56,282	209,662	78,479	6,730	1,438	47,614	134,261	343,923
J. G. Araujo	184,569	14,874	71,352	10,632	281,427	46,240	160	11,320	1,200	58,920	340,347
Ohliger & Co.	21,027	1,120	4,989	23,009	50,145	.....	.....	.....	.....	.....	50,145
H. Balding	20,985	.....	.....	.....	20,985	.....	.....	.....	.....	.....	20,985
J. L. Traqueia	7,284	622	2,181	.....	10,087	.....	.....	.....	.....	.....	10,087
W. Peters	3,020	300	5,340	1,370	10,030	.....	.....	.....	.....	.....	10,030
B. Levy & Co.	.....	.....	.....	.....	.....	7,626	932	610	300	9,468	9,468
Tho. Levy Camille & Co.	.....	.....	.....	.....	.....	4,923	466	2,165	550	8,104	8,104
Mesquita & Co.	.....	.....	.....	.....	.....	.....	285	665	80	1,030	1,030
	711,489	165,149	351,814	309,803	1,538,250	643,822	27,590	17,942	200,292	889,646	2,427,896
In transit, Iquitos	127,750	10,657	60,131	117,562	316,100	.....	.....	.....	.....	.....	316,100
Totals, February, 1917	839,239	175,801	411,945	427,365	1,854,350	643,822	27,590	17,942	200,292	889,646	2,743,996
Totals, January, 1917	626,826	48,803	24,379	156,331	856,339	434,482	79,139	177,199	130,568	821,388	1,677,727

Compiled by Stowell & Co.

EXPORTS OF INDIA RUBBER FROM MANAOS DURING MARCH, 1917.

	New York.					Europe.					Grand
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Totals.
General Rubber Co. of Brazil. *kilos*	48,038	5,386	60,830	172,746	287,000	191,479	45,671	7,646	84,204	329,000	616,000
Tancredo Porto & Co.	163,309	12,028	48,141	80,622	304,100	80,551	732	399	44,576	126,258	430,358
Stowell & Co.	28,623	2,164	23,766	139,726	194,279	132,400	9,212	4,381	1,565	147,558	341,837
Ohliger & Co.	121,105	9,375	43,768	72,303	246,551	.....	.....	.....	.....	.....	246,551
J. G. Araujo	26,450	4,423	41,905	1,866	74,644	89,244	7,685	7,447	31,055	135,431	210,075
Adelbert H. Alden, Limited	154	5,246	13,725	54	19,179	59,949	620	2,221	72,203	134,993	154,172
A. F. de Souza & Co.	14,188	.....	2,818	5,161	22,167	.....	.....	.....	.....	.....	22,167
J. L. Traqueia	14,230	960	5,220	.....	20,410	.....	.....	.....	.....	.....	20,410
W. Peters	4,800	150	3,420	6,645	15,015	.....	.....	.....	.....	.....	15,015
Semper & Co.	8,160	800	990	.....	9,950	.....	.....	.....	.....	.....	9,950
H. Pralow	2,082	66	4,028	1,197	7,373	.....	.....	.....	.....	.....	7,373
Tho. Levy Camille & Co.	.....	.....	.....	.....	.....	144	.....	1,722	150	2,016	2,016
Mesquita & Co.	160	.....	.....	.....	160	.....	.....	.....	.....	.....	160
	431,299	40,598	248,611	480,320	1,200,828	553,767	63,920	23,816	233,753	875,256	2,076,084
In transit, Iquitos	11,349	.....	6,918	29,096	47,363	59,934	8,650	23,228	119,925	211,737	259,100
Totals, March, 1917	442,638	40,598	255,529	509,416	1,248,191	613,701	72,570	47,044	353,678	1,086,993	2,335,184

EXPORTS OF INDIA RUBBER FROM PARA AND MANAOS DURING FEBRUARY, 1917.

	New York.					Europe.					Grand
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Totals.
Stowell & Co. *kilos*	305,539	37,396	144,062	113,015	600,012	193,523	13,393	3,190	8,140	218,246	818,258
J. Marques	13,430	29,718	145,621	21,150	209,919	310,377	25,329	89,311	151,233	576,250	786,169
General Rubber Co.	239,165	19,147	179,192	81,708	519,212	13,577	1,063	953	766	16,359	535,571
Pires Teixeira & Co.	126,252	13,325	118,063	71,982	329,622	11,149	.....	.....	.....	11,149	340,771
Suarez Hermanos & Co., Limited	163,602	.....	3,197	30,724	197,523	.....	.....	.....	14,039	14,039	211,562
Adelbert H. Alden, Limited	30,577	12,064	24,028	4,244	70,913	80,344	.....	.....	.....	80,344	151,257
Berringer & Co.	94,622	5,027	19,591	12,039	131,279	.....	.....	.....	.....	.....	131,279
G. Fradelizi & Co.	47,684	5,129	31,605	3,504	87,922	13,832	340	.....	.....	14,172	102,094
Seligmann & Co.	13,024	16	1,570	7,520	22,130	.....	.....	.....	.....	.....	22,130
Sundries	63,030	1,494	95,260	94,626	254,410	7,844	3,383	1,534	8,250	21,011	275,421
	1,096,925	123,316	762,189	440,512	2,422,942	630,646	43,508	94,988	182,428	951,570	3,374,512
From Itacoatiara	2,720	.....	1,400	7,200	11,320	900	.....	650	2,550	4,100	15,420
From Manaos	638,746	151,263	320,240	340,957	1,451,206	643,822	27,590	17,942	200,292	889,646	2,340,852
From Iquitos	19,818	165	6,242	24,127	50,352	.....	.....	.....	.....	.....	50,352
Totals, February, 1917	1,758,209	274,744	1,090,071	812,796	3,935,820	1,275,368	71,098	113,580	385,270	1,845,316	5,781,136

EXPORTS OF INDIA RUBBER FROM PARA AND MANAOS DURING MARCH, 1917.

	New York.					Europe.					Grand
EXPORTERS.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Fine.	Medium.	Coarse.	Caucho.	Totals.	Totals.
Stowell & Co. *kilos*	92,005	10,411	87,322	115,082	304,820	120,093	9,674	1,119	.....	130,886	435,706
J. Marques	122,638	563	82,227	18,159	223,587	67,728	27,789	10,037	.....	105,554	329,141
General Rubber Co.	109,089	2,115	41,398	65,140	217,742	48,266	3,913	2,035	39	54,253	271,995
Suarez Hermanos & Co., Limited	188,783	.....	3,950	5,800	198,533	9,076	.....	13,366	10,408	32,850	231,383
Pires Teixeira & Co.	46,331	6,602	43,643	24,795	121,371	.....	.....	.....	.....	.....	121,371
Chamie & Co.	.....	?J	NV	..CEb	? n4	84,374	.....	.....	.....	.....	84,374
G. Fradelizi & Co.	11,832	.....	.....	.....	11,832	53,878	.....	.....	.....	53,878	65,710
Berringer & Co.	19,497	7,275	26,825	8,297	61,894	.....	.....	.....	.....	.....	61,894
Adelbert H. Alden, Limited	.....	3,159	3,393	3,245	9,797	38,510	.....	.....	.....	38,510	48,307
Bitar Irmãos	3,520	1,920	600	20,850	26,890	.....	.....	.....	.....	.....	26,890
Seligmann & Co.	6,916	.....	.....	12,086	19,002	.....	.....	.....	.....	.....	19,002
Sundries	5,687	.....	4,224	8,461	18,372	22,704	2,803	1,583	12,535	39,625	57,997
	610,181	32,142	315,880	340,011	1,298,214	360,255	44,179	28,140	22,982	455,556	1,753,770
From Itacoatiara	.....	.....	.....	.....	.....	1,260	.....	650	170	2,080	2,080
From Manãos	387,182	51,209	223,097	367,156	1,028,644	302,314	27,164	7,937	197,169	534,634	1,563,278
From Iquitos	126,284	10,492	60,807	115,528	313,111	59,934	8,650	23,228	119,925	211,737	524,848
Totals, March, 1917	1,123,647	93,843	599,784	822,695	2,639,969	723,763	79,993	60,005	340,246	1,204,007	3,843,976

Crude Rubber Statistics for Brazil 1910-1914.

EXPORTS.

	1910.	1911.	1912.	1913.	1914.
UPRIVER FINE—*Kilos:*					
Manaos	8,813,774	9,359,486	9,707,045	7,998,882	7,598,211
Itacoatiara	53,549	81,829	106,103	94,701	105,878
Obidos	.....	.....	.....	818	.....
Para	8,349,306	7,597,430	9,592,742	8,295,030	7,901,291
Totals	17,216,629	17,038,745	19,405,890	16,389,431	15,605,380
UPRIVER MEDIUM:					
Manaos	1,650,833	1,925,364	1,826,823	1,542,930	1,506,014
Itacoatiara	8,742	9,531	11,147	12,124	6,252
Obidos	.....	.....	.....	323	.....
Para	1,142,306	1,142,306	1,367,270	1,309,817	1,147,205
Totals	2,801,881	3,077,201	3,205,240	2,865,194	2,659,471
ISLANDS COARSE:					
Manaos	2,374,591	2,375,172	2,566,511	2,058,873	1,937,755
Itacoatiara	34,937	46,935	65,299	56,063	50,631
Para	4,957,056	4,710,500	6,021,676	5,153,717	4,534,107
Totals	7,366,584	7,132,607	8,653,486	7,268,653	6,522,493
CAUCHO:					
Manaos	3,831,286	2,876,719	3,171,947	4,148,064	3,046,153
Itacoatiara	3,923	2,705	20,382	28,631	30,173
Para	2,238,390	2,004,856	3,382,254	3,140,125	3,217,546
Totals	6,073,599	4,884,280	6,574,583	7,316,820	6,293,872
PARA NOT SPECIFIED:					
San Luiz do Maranhão	6,207	14,219	10,294	12,226	44,276
Ilha do Cajueiro	26,432	6,940	25,509	42,173	61,888
Bahia	.....	.....	.....	.....	.....
Rio de Janeiro	.....	.....	.....	.....	36,471
Porto Murtinho	380	.....	.....	.....	.....
Corumba	646,426	649,635	276,784	540,635	489,409
Totals	679,445	670,794	312,587	595,034	632,044
Grand Totals	34,138,137	32,652,983	38,151,780	34,435,132	31,713,260
PARA—(ALL SORTS):					
From—					
Manaos	16,670,484	16,536,741	17,272,326	15,748,749	14,088,133
Itacoatiara	101,151	141,000	202,931	191,519	192,934
Obidos	.....	.....	.....	1,141	.....
Para	16,687,057	15,304,448	20,363,942	17,898,689	16,800,149
San Luiz do Maranhão	6,207	14,219	10,294	12,226	44,276
Ilha do Cajueiro	26,432	6,940	25,509	42,173	61,888
Bahia	.....	.....	.....	.....	.....
Rio de Janeiro	.....	.....	.....	.....	36,471
Porto Murtinho	380	.....	.....	.....	.....
Corumba	646,426	649,635	276,784	540,635	489,409
Totals	34,138,137	32,652,983	38,151,786	34,435,132	31,713,260
To—					
Germany	952,592	489,597	735,781	685,683	430,343
Argentine	.....	.....	.....	13,080	67,144
Belgium	112,847	137,647	111,894	173,148	.....
United States	14,373,486	15,461,010	20,486,200	16,506,910	18,674,122
France	2,498,263	2,036,326	3,049,593	2,787,865	1,282,952
Great Britain	15,721,749	14,277,521	13,768,318	13,836,087	10,773,356
Italy	.....	.....	.....	.....	36,471
Portugal	.....	.....	.....	.....	26,605
Uruguay	479,200	250,882	.....	432,359	422,265
Totals	34,138,137	32,652,983	38,151,786	34,435,132	31,713,260
MANIÇOBA:					
From—					
Manaos	.....	.....	.....	795	.....
Para	.....	300	.....	.....	.....
San Luiz do Maranhão	9,797	10,434	14,815	9,797	11,907
Ilha do Cajueiro	566,684	686,295	609,772	436,428	287,128
Amarração	.....	.....	.....	10,109	.....
Camocim	.....	.....	398	470	.....
Fortaleza	1,027,838	949,876	1,088,525	435,631	548,649
Natal	11,871	847	4,358	1,473	4,874
Cabedello	3,950	.....	.....	.....	.....
Pernambuco	49,462	48,911	77,428	117,757	113,373
Bahia	1,948,604	1,747,868	1,929,533	542,783	764,838
Totals	3,618,206	3,444,531	3,724,829	1,555,243	1,730,769
To—					
Germany	272,424	352,355	686,499	233,201	35,791
Argentine	.....	.....	143	.....	.....
Belgium	15,154	16,330	14,250	.....	427
United States	908,743	653,695	775,150	283,300	690,601
France	905,690	1,172,355	1,368,891	400,805	315,846
Great Britain	1,516,195	1,226,140	879,896	637,790	688,104
Holland	.....	23,656	.....	.....	.....
Uruguay	.....	.....	.....	147	.....
Totals	3,618,206	3,444,531	3,724,829	1,555,243	1,730,769

MANGABEIRA:

From—	1910.	1911.	1912.	1913.	1914.
Para	340	1,384	2,472	581	.....
San Luiz do Maranhão	25,101	9,193	7,457	8,997	6,839
Ilha do Cajueiro	54,327	58,469	35,818	34,226	14,026
Amarração	.....	.....	.....	1,370	.....
Fortaleza	26,392	5,410	1,878	.....	.....
Areia Branca	.....	.....	.....	.....	3,049
Natal	11,530	3,140	15,091	5,290	955
Cabedello	18,263	11,401	6,319	4,177	.....
Pernambuco	72,351	22,976	12,604	2,024	3,606
Maceio	7,883	6,169	3,375	1,386	60
Aracaju	.....	700	261	.....	.....
Bahia	188,284	44,740	96,034	50,012	41,233
Rio de Janeiro	182,344	131,134	135,117	47,234	2,384
Santos	94,445	64,284	47,702	29,367	8,403
Porto Murtinho	4,435	1,837	9,951	3,291	.....
Corumba	95,387	76,326	14,792	38,321	5,415
Totals	781,082	437,163	388,871	226,276	85,970
To—					
Germany	326,991	208,022	224,708	85,288	15,297
Argentine	.....	.....	.....	578	479
Belgium	3,190	1,774	.....	1,600	693
Cape Colony	.....	.....	.....	1,875	.....
United States	167,635	31,294	60,240	16,757	32,555
France	33,557	8,414	10,534	5,769	9,401
Great Britain	189,761	158,201	80,043	83,655	22,209
Holland	.....	150	.....	.....	.....
Italy	.....	.....	1,480	.....	200
Paraguay	1,403	.....	.....	360	.....
Portugal	.....	2,780	1,225	1,000	.....
Uruguay	58,545	26,528	10,641	29,394	5,136
Totals	781,082	437,163	388,871	226,276	85,970

SCRAP:

From—					
Manaos	9,545	12,458	20,603	14,900	.....
To—					
Germany	2,327	8,113	13,247	9,355	.....
France	7,218	4,345	7,356	5,545	.....
Totals	9,545	12,458	20,603	14,900	.....

BALATA:

From—					
Manaos	.....	.....	.....	.....	1,490
To—					
Great Britain	.....	.....	.....	.....	1,490

TOTAL RUBBER:

From—					
Manaos	16,680,029	16,549,199	17,292,929	15,764,444	14,089,623
Itacoatiara	101,151	141,000	202,931	191,519	192,934
Obidos	.....	.....	.....	1,141	.....
Para	16,687,397	15,306,132	20,366,414	17,899,270	16,800,149
San Luiz do Maranhão	41,105	33,846	32,566	31,020	63,022
Ilha do Cajueiro	647,443	751,704	671,099	512,827	363,042
Amarração	.....	.....	.....	11,479	.....
Camocim	.....	.....	398	470	.....
Fortaleza	1,054,230	955,286	1,090,403	435,631	548,649
Areia Branca	.....	.....	.....	.....	3,049
Natal	23,401	3,987	19,449	6,763	5,829
Cabedello	22,213	11,401	6,319	4,177	.....
Pernambuco	121,813	71,887	90,032	119,781	116,979
Maceio	7,883	6,169	3,375	1,386	60
Aracaju	.....	700	261	.....	.....
Bahia	2,136,888	1,792,608	2,025,567	592,795	806,071
Rio de Janeiro	182,344	131,134	135,117	47,234	38,855
Santos	94,445	64,284	47,702	29,367	8,403
Porto Murtinho	4,815	1,837	9,951	3,291	.....
Corumba	741,813	725,961	291,576	578,956	494,824
Totals	38,546,970	36,547,135	42,286,089	36,231,551	33,531,489
To—					
Germany	1,554,334	1,058,087	1,660,235	1,013,527	481,433
Argentine	.....	.....	143	13,658	67,623
Belgium	131,191	155,751	126,144	174,748	1,120
Cape Colony	.....	.....	.....	1,875	.....
United States	15,449,864	16,145,999	21,321,590	16,806,967	19,397,278
France	3,444,728	3,221,440	4,436,374	3,199,984	1,608,199
Great Britain	17,427,705	15,661,862	14,728,257	14,557,532	11,485,159
Holland	.....	23,806	.....	.....	.....
Italy	.....	.....	1,480	.....	36,671
Paraguay	1,403	.....	.....	360	.....
Portugal	.....	2,780	1,225	1,000	26,605
Uruguay	537,745	277,410	10,641	461,900	427,401
Totals	38,546,970	36,547,135	42,286,089	36,231,551	33,531,489

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—*free:*	January, 1917. Pounds.	Value.
Rubber and gutta percha, crude caoutchouc or india rubber:		
From—		
Great Britain	318,825	$197,245
United States	674,408	429,737
Straits Settlements	91,699	54,861
Other countries	95	38
Totals	1,085,027	$681,881
Rubber, recovered:		
From—		
Great Britain	29,484	$1,548
United States	620,874	80,734
Totals	650,358	$82,282
Hard rubber, in sheets and rods:		
From—		
United States	8,209	$1,427
Rubber substitute:		
From—		
United States	71,165	$7,236
Rubber, powdered, and rubber or gutta percha waste:		
From—		
Great Britain	4,928	$729
United States	108,119	10,198
Other countries	767	46
Totals	113,814	$10,973
Rubber thread, not covered:		
From—		
United States	3,080	$4,582
Chicle, crude:		
From—		
United States	540,480	$178,773
British Honduras	394,635	141,539
Mexico	52,380	16,071
Totals	987,495	$336,383

MANUFACTURED—*dutiable:*	General Tariff. Value.	Preferential Tariff. Value.
Boots and shoes:		
From—		
United States	$24,371	.....
Belting:		
From—		
United States	$6,352	.....
Waterproof clothing:		
From—		
Great Britain	.....	$31,961
United States	$24,636	.....
Totals	$24,636	$31,961
Hose, lined with rubber:		
From—		
Great Britain	.....	$12
United States	$7,308	.....
Totals	$7,308	$12
Mats and matting:		
From—		
United States	$85	.....
Packing:		
From—		
Great Britain	.....	$41
United States	$10,352	.....
Totals	$10,352	$41
Tires of rubber for all vehicles:		
From—		
Great Britain	.....	$2,182
United States	$93,099	.....
France	216	.....
Totals	$93,315	$2,182
Rubber cement and all other manufactures of india rubber and gutta percha, N.O.P.:		
From—		
Great Britain	$27	$7,323
United States	68,315	.....
Other countries	3	.....
Totals	$68,345	$7,323

Webbing—over one inch wide:	January, 1917. Pounds.	Value.
From—		
Great Britain	.....	$954
United States	$24,197	.....
Totals	$24,197	$954

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

MANUFACTURED—	January, 1917. Produce of Canada. Value.	Reëxports of Foreign Goods. Value.
Belting:		
To—		
United States	$517	.....
Newfoundland	1,130	.....
Total	$1,647	.....
Hose:		
To—		
Great Britain	$2,000	.....
United States	20	$18
Newfoundland	648	.....
Other countries	8,637	.....
Totals	$11,305	$18
Boots and shoes:		
To—		
Great Britain	$25,108	.....
United States	27	$9
Newfoundland	15,423	.....
Australia	2,115	.....
New Zealand	17,330	.....
Other countries	1,448	.....
Totals	$61,451	$9
Tires:		
To—		
Great Britain	$296	.....
United States	3,125	$821
Newfoundland	40	.....
Other countries	1,998	.....
Totals	$5,459	$821
Waterproof clothing:		
To—		
Great Britain	$190	.....
United States	.....	$46
Other countries	12	.....
Totals	$202	$46
Waste:		
To—		
United States	$792	$8,483
All other, N. O. P.:		
To—		
Great Britain	$626	$500
United States	144	1,505
Newfoundland	91	.....
Other countries	603	.....
Totals	$1,464	$2,005
Gum chicle:		
To—		
United States	$169,710	.....

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—	Eleven Months Ending November, 1916. Pounds.	Lira.
India rubber and gutta percha —raw and reclaimed:		
From—		
Great Britain	3,813,920	.....
Straits Settlements	1,186,460	.....
African French Colony	27,500	.....
Belgian Congo	219,120	.....
Brazil	4,226,200	.....
Other countries	1,712,920	.....
Totals	11,186,120	40,676,800
Rubber scrap	6,279,020	2,568,690
MANUFACTURED—		
India rubber and gutta percha —threads:		
From—		
United States	61,600	.....
Great Britain	27,720	.....
Other countries	6,380	.....
Totals	95,700	870,000

	Eleven Months Ending November, 1916. Pounds.	Lira.
India rubber and gutta percha —sheets:		
Cut sheets	3,740	28,900
Elastic fabric	1,760	3,600
Insulated wire	440	600
Hard rubber	79,860	290,400
India rubber and gutta percha —tubes:		
Cut sheets	1,100	9,000
Elastic fabrics	13,200	36,000
Other forms	6,600	21,000
Belting	127,820	406,700
Rubber coated fabrics..*pieces*	114,620	729,400
MANUFACTURED—		
From—		
Great Britain	42,020	.....
Other countries	1,760	.....
Totals	43,780	199,000
Boots and shoes—*pairs:*		
United States	39,266	.....
France	10,299	.....
Other countries	179	.....
Totals	49,744	248,720
Elastic webbing:		
France	26,180	.....
Great Britain	13,640	.....
Other countries	13,860	.....
Totals	53,680	366,000
Clothing and articles for travel	3,080	32,200
Articles not specified from cut sheets	13,640	124,000
Fabrics:		
From—		
Great Britain	219,340	.....
France	115,060	.....
Other countries	9,020	.....
Totals	343,420	1,404,900
Tires and tubes:		
From—		
France	1,508,540	.....
Great Britain	488,840	.....
Other countries	31,240	.....
Totals	2,028,620	18,442,000
Other rubber manufactures:		
From—		
United States	1,372,140	.....
France	942,700	.....
Great Britain	819,720	.....
Other countries	1,320	.....
Totals	3,135,880	11,403,200
Total Imports	.....	77,861,110

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

UNMANUFACTURED—	Eleven Months Ending November, 1916. Pounds.	Lira.
India rubber and gutta percha —raw and reclaimed:		
To—		
United States	496,980	.....
Great Britain	40,040	.....
Spain	419,980	.....
Other countries	14,080	.....
Totals	971,080	1,765,600
MANUFACTURED—		
India rubber and gutta percha —threads:		
To—		
France	11,880	.....
Great Britain	10,120	.....
Spain	12,540	.....
Switzerland	7,040	.....
Argentine	3,740	.....
Other countries	3,960	.....
Totals	49,280	448,000
India rubber and gutta percha —sheets:		
Cut sheets	4,620	35,700
Elastic fabric	3,520	7,200
Insulated wire	880	1,200
Hard rubber	45,540	165,600

MANUFACTURED—	Eleven Months Ending November, 1916. Pounds.	Lira.
India rubber and gutta percha —tubes:		
Cut sheets	11,440	93,600
Elastic fabric	153,780	419,400
Other forms	112,860	359,100
Elastic webbing:		
Belting	1,540	4,900
Rubber coated fabrics...*pieces*	131,120	.....
Boots and shoes.....*pairs*	2	10
To—		
France	8,360	.....
Greece	119,680	.....
Spain	13,860	.....
Switzerland	80,520	.....
Egypt	25,740	.....
Argentina	108,020	.....
Brazil	117,700	.....
Chili	22,440	.....
Cuba	33,440	.....
Other countries	64,460	.....
Totals	594,220	4,051,500
Clothing and articles for travel	3,740	39,100
Articles not specified from cut sheets:		
To—		
Great Britain	11,220	.....
Spain	440	.....
Argentina	24,860	.....
Brazil	220	.....
Uruguay	3,300	.....
Other countries	2,420	.....
Totals	42,460	386,000
Fabrics	78,760	322,200

MANUFACTURED—	Eleven Months Ending November, 1916. Pounds.	Lira.
Tires and tubes:		
To—		
France	493,020	.....
Great Britain	3,859,900	.....
Switzerland	67,320	.....
India and Ceylon	419,100	.....
Australia	81,620	.....
Argentina	906,400	.....
Brazil	529,320	.....
Other countries	643,280	.....
Totals	6,999,960	63,636,000
Other rubber manufactures:		
To—		
Albania	7,260	.....
France	60,060	.....
Great Britain	60,060	.....
Spain	12,980	.....
Switzerland	52,800	.....
Egypt	13,640	.....
Argentina	99,880	.....
Brazil	58,520	.....
Uruguay	25,080	.....
Other countries	42,240	.....
Totals	432,520	1,572,800
Total Exports	.....	73,814,510

The nominal value of a lira is $0.193.

SWITZERLAND STATISTICS FOR INSULATED CABLES.

IMPORTS.

	1914. Francs.	1915. Francs.	Inc. or Dec. Francs.
Electric cable, insulated with rubber or paper:			
From—			
Germany	90,000	5,000	— 85,000
Great Britain	.....	1,000	+ 1,000
France	20,000	4,000	— 16,000
Other countries	3,000	142,000	+139,000
Totals	113,000	152,000	+ 39,000
Cable insulated with rubber or paper and covered with textiles:			
From—			
Germany	171,000	6,000	—165,000
Italy	9,000	184,000	+175,000
Great Britain	16,000	27,000	+ 11,000
Other countries	5,000	1,000	— 4,000
Totals	201,000	218,000	+ 17,000

EXPORTS.

	1914. Francs.	1915. Francs.	Inc. or Dec. Francs.
Electric cable, insulated with rubber or paper:			
To—			
Germany	28,000	135,000	+107,000
France	89,000	4,000	— 85,000
Italy	7,000	.....	— 7,000
Other countries	153,000	20,000	—133,000
Totals	277,000	159,000	—118,000
Cable insulated with rubber or paper and covered with textiles:			
To—			
Germany	.....	69,000	+ 69,000
France	9,000	.....	— 9,000
Italy	56,000	.....	— 56,000
Great Britain	124,000	8,000	—116,000
Other countries	106,000	10,000	— 96,000
Totals	295,000	87,000	—208,000

LONDON AND LIVERPOOL RUBBER STATISTICS.

IMPORTS.

UNMANUFACTURED—	February, 1917. London. Pounds.	£ Sterling.	Liverpool. Pounds.	£ Sterling.
Crude rubber:				
From—				
German West Africa	.....	.....	21,300	1,617
German Possessions in Pacific	25,300	3,795	.....	.....
France	.....	.....	18,200	1,726
French West Africa	.....	.....	85,300	8,900
Madagascar	10,000	1,400	.....	.....
Java	635,400	84,336	.....	.....
Other Dutch Possessions in Indian Seas	855,400	130,388	.....	.....
Portugal	.....	.....	1,800	50
Portuguese East Africa	27,000	3,003	.....	.....
Liberia	.....	.....	20,200	1,000
United States	.....	.....	172,500	18,610
Peru	.....	.....	137,400	18,708
Brazil	.....	.....	3,786,500	556,370
Uruguay	.....	.....	23,200	2,559
Egypt	.....	.....	1,100	90
Gold Coast	.....	.....	74,400	5,243
Nigeria	.....	.....	260,200	19,265
Cape of Good Hope	13,000	1,890	.....	.....
British East Africa	.....	.....	1,700	200
Anglo Egyptian Soudan	.....	.....	200	30
Seychelles	500	50	.....	.....
Zanzibar	.....	.....	500	40
British India	466,700	62,942	.....	.....
Straits Settlements	2,435,300	358,482	560,500	86,706
Federated Malay States	4,418,600	590,642	7,700	1,489
Ceylon	1,422,100	210,458	26,800	5,793
British North Borneo	297,600	42,331	.....	.....
Victoria	23,800	4,000	.....	.....
New South Wales	3,100	465	.....	.....
British West Indian Islands	1,800	258	.....	.....
British Guiana	1,000	161	.....	.....
Totals	10,636,600	1,494,601	5,199,500	728,396
Waste and reclaimed rubber:				
From—				
United States	22,300	1,440	3,300	90
Brazil	.....	.....	3,400	86
Cape of Good Hope	6,600	320	.....	.....
New Zealand	2,400	32	.....	.....
Totals	31,300	1,792	6,700	176

EXPORTS.

UNMANUFACTURED—	February, 1917. London. Pounds.	£ Sterling.	Liverpool. Pounds.	£ Sterling.
Waste and reclaimed rubber manufactures of the United Kingdom:				
To—				
United States	717,500	5,660	380,800	10,016
Russia	.....	.....	126,300	4,998
France	51,700	1,925	45,200	2,046
Italy	36,000	450	40,200	900
Canada	17,900	172	.....	.....
Japan	22,400	319	.....	.....
Totals	845,500	8,526	592,500	17,960

REEXPORTS.

Crude rubber:				
To—				
United States	7,868,600	1,154,444	394,400	41,416
Russia	.....	.....	1,139,900	150,880
France	2,207,200	314,082	898,800	137,109
Italy	673,800	95,108	405,400	62,110
Spain	.....	.....	13,000	1,510
Norway	.....	.....	53,900	7,873
Victoria	4,000	524	4,000	435
Canada	543,600	84,542	68,200	8,623
Japan (including Formosa and leased territories in China)	.....	.....	2,000	385
New South Wales	.....	.....	5,600	575
Totals	11,297,200	1,648,700	2,985,200	410,916
Waste and reclaimed rubber:				
To—				
United States	.....	.....	22,300	822
France	.....	.....	9,700	140
Italy	.....	.....	17,500	525
Japan (including Formosa and leased territories in China)	.....	.....	800	39
Canada	.....	.....	11,100	560
Denmark (including Faroe Islands)	2,200	110	.....	.....
Totals	2,200	110	61,400	2,086

The value of a £ Sterling is $4.76.

RUBBER IMPORTS AT BORDEAUX, FRANCE.

During 1916 French rubber imports were more than double those of 1915. The total for the port of Bordeaux reached 4,021,133 pounds against 1,704,282 pounds in 1915, as follows:

From—	1916.	1915.
Congo ..... *pounds*	2,107,971	443,996
Conakry, Rio Nunez and Bissao.....	882,235	752,349
Soudan	235,553	26,744
Casamance	123,523	37,289
Ivory Coast	254,015	75,770
Madagascar	16,947	48,106
Manicoba	139,582	188,870
Indo-China	1,737	202
Balata	259,570	130,956
Totals	4,021,133	1,704,282

These figures include only direct importations from producers. Stocks on hand, December 31, 1916, totaled 130 tons.

THE MARKET FOR RUBBER SCRAP.

Copyright 1917.

NEW YORK.

THE active demand that was anticipated after hostilities with Germany were definitely announced has failed to materialize. In fact, the past month was very quiet in the rubber scrap market and prices have not undergone any material change. The usual spring arrivals have been held up by shipping difficulties that continued to interfere with the movement of supplies. The consuming trade has shown small interest in the market and buying has been confined to small lots for immediate requirements. The tendency in all quarters is to await the outcome of the unusual conditions prevailing at this time.

Boots and Shoes. There was very little attention paid to this material during the month, and while the delivered price was nominally held at 9 cents, dealers were asking 9¼ cents, Trimmed arctics received moderate attention early in the month but later became dull and the prices recorded show no change from last month's report.

Tires. The lack of demand for white G. & G. tires has resulted in easier prices and quotations for this grade are around 7½ cents delivered. Mixed tires have been fairly steady at unchanged prices. Solid tires have been in moderate demand at prices ranging from 6 to 6½ cents.

Inner Tubes. This material has become easier, due, no doubt, to the steady position of crude rubber. No. 1 tubes are now 25½ cents delivered as compared to 26 and 27 cents quoted a month ago.

Mechanicals. There has been a fairly good call for garden hose and prices show an advance of about ½ cent a pound since last month. The other grades have received no attention, and prices have remained unchanged.

London and Liverpool imports of waste and reclaimed rubber for February were 38,000 pounds against 538,400 pounds for January. Reexports for February were 63,600 pounds against 1,417,800 pounds for January.

NEW YORK QUOTATIONS FOR CARLOAD LOTS DELIVERED.

APRIL 26, 1917.

Prices subject to change without notice.

	Per Pound.	
Boots and shoes	$0.09 @	.09¼
Trimmed arctics	.07½@	
Untrimmed arctics	**.06½@**	
White tires, Goodrich and Goodyear	.07½@	.07¾
Auto tires, standard white	**.07¼@**	.07½
standard mixed	**.06¾@**	.06⅞
stripped, unguaranteed	.05½@	.06
Auto peelings, No. 1	.10 @	
No. 2	**.08¼@**	.09
Inner tubes, No. 1	.25½@	.26
No. 2	**.12½@**	**.13**
red	.12½@	.13
Ironv tires	**.02⅛@**	
Bicycle tires	.04⅞@	.05⅛
Solid tires	.06 @	.06½
White scrap, No. 1	**.13½@**	**.14**
No. 2	.10 @	
Red scrap, No. 1	.10 @	**.11**
No. 2	.08 @	
Mixed black scrap, No. 1	.04½@	.05
No. 2	**.04 @**	
Rubber car springs	.04½@	.05
Horse shoe pads	.04¾@	.05
Matting and packings	.01¼@	.01½
Garden hose	.02 @	**.02¼**
Air brake hose	**.05½@**	**05¾**
Cotton fire hose	.02½@	
Large hose	.01⅞@	.02¼
Hard rubber scrap, No. 1, bright fracture	**.26 @**	
Battery jars (black compound)	.02½@	.03
Insulated wire stripping	.03½@	
Rubber heels	.03¾@	

THE MARKET FOR COTTON AND OTHER FABRICS.

NEW YORK.

Copyright 1917.

THE entry of this country in the war materially increased the buying movement that was in evidence early in April when middling cotton was quoted 19.35 cents for spot. War stimulation soon carried the market over the 20-cent mark, and on April 9, middling spot cotton was selling at 20.15 cents with July futures at 21.40 cents. Since then the market has been nervous and unsettled, traders showing a pronounced tendency to await developments. As the month progressed there was less demand for spot cotton and prices softened, 20.05 cents being the quotations on April 26.

Egyptian Cotton. An extraordinary demand for Egyptian has characterized the April market. The extremely small spot stocks available and the British embargo have complicated the situation. Direct shipment in American bottoms appears to be the only relief and is hopefully looked forward to by the consuming trade. Prices are extremely high, the best grades of Sakellarides have sold as high as 70 cents during the month. For the period, August 1 to March 14, 1917, 105,215 bales were exported from Alexandria to the United States, against 173,033 bales for the same period a year ago. Mail advices from Alexandria, dated March 23, state that all business with America has stopped and no arrangements for direct shipments have been made.

Sea Island Cotton. There has been a steady demand during the month, but business has been restricted by the scarcity of stocks. Prices have advanced steadily and quotations are difficult to obtain; however, sales at 75 cents have been reported. For the period, August 1 to March 30, 1917, 86,178 bales were shipped from southern ports, as compared to 63,225 bales for the same period last year.

Tire Fabrics. Business has been brisk, the matter of delivery being the paramount question. The mills are all sold up to the end of the year and some contracts with consumers cover part of next year's requirements. The scarcity of Sea Island and Egyptian staples has created an active demand for Peeler fabrics. The cord fabrics made of cabled yarn are particularly in favor at this time. Standard 17¼-ounce Sea Island and Egyptian building fabrics have advanced about 5 cents a square yard and all indications are for higher prices.

Sheetings, Drills and Osnaburgs. All grades have been in heavy demand with the question of delivery being the controlling factor. Prices have advanced in the entire list from 1 to 3 cents a yard.

Hose and Belting Duck. Government requirements have greatly stimulated this material by the call for large quantities of army duck. Prices on mechanical duck have advanced about 5 cents a pound during April and higher levels are predicted for the future.

NEW YORK QUOTATIONS.

APRIL 27, 1917.

Prices subject to change without notice.

Airplane and Balloon Fabrics:			
Wamsutta, S. A. I. L. No. 1, 40-inch	yard	$0.47	@
No. 4, 38½-inch		.42½	@
Wool Stockinettes—52-inch:			
A—14-ounce	yard	1.50	@
B—14-ounce		2.00	@
C—14-ounce		2.25	@
Cotton Stockinettes—52-inch:			
D—14-ounce	yard	.65	@ .70
E—11½-ounce		.50	@ .60
F—14-ounce		.70	@ .75
G— 8-ounce		.60	@ .65
H—11-ounce		.65	@ .75
I — 9-ounce		.53	@ .60
Colors—white, black, blue, brown			
Knitabac Stockinette	lb.	1.35	@ 1.50
Tire Fabrics:			
17½-ounce Sea Island, combed	square yard	1.50	@ 1.60
17¼-ounce Egyptian, combed		1.30	@ 1.40
17¼-ounce Egyptian, carded		1.20	@ 1.30
17¼-ounce Peelers, combed		.85	@ .90
17¼-ounce Peelers, carded		.70	@ .75
Sheeting:			
40-inch 2.35-yard	yard	.16	@
40-inch 2.50-yard		.15	@
40-inch 2.70-yard		.14½	@ .14½
40-inch 2.85-yard		.13½	@ .14
40-inch 3.15-yard		.13	@ .13½
Osnaburgs:			
40-inch 2.25-yard	yard	.17½	@
40-inch 2.48-yard		.16½	@
37½-in. 2.42-yard		.16½	@
Mechanical Ducks:			
Hose	pound	.41	@ .42
Belting		.40	@ .42
Carriage Cloth Duck:			
38-inch 2.00-yard enameling duck	yard	.22	@
38-inch 1.74-yard		.24½	@
72-inch 16.66-ounce		.47½	@
72-inch 17.21-ounce		.49	@
Drills:			
38-inch 2.00-yard	yard	.20½	@
40-inch 2.47-yard		.16⅝	@
52-inch 1.90-yard		.22	@
52-inch 1.95-yard		.21½	@
60-inch 1.52-yard		.27½	@
Imported Woolen Fabrics Specially Prepared for Rubberizing—Plain and Fancies:			
63-in, 3½ to 7½ ounces	yard	.38	@ 1.55
36-inch, 2¼ to 5 ounces		.35	@ .85
Imported Plaid Lining (Union and Cotton):			
63-inch, 2 to 4 ounces	yard	.35	@ .75
36-inch, 2 to 4 ounces		.25	@ .50
Domestic Worsted Fabrics:			
36-inch, 4½ to 8 ounces	yard	.35	@ .65
Domestic Woven Plain Linings (Cotton):			
36-inch, 3¼ to 5 ounces	yard	.10	@ .18
Raincoat Cloth (Cotton):			
Bombazine	yard	.08	@ .09½
Twills		.12	@ .18
Tweed		.25	@ .35
Tweed, printed		.07½	@ .15
Plaid		.08½	@ .10
Repp		.24	@ .27
Burlaps:			
32—7½-ounce	100 yards	7.00	@
40—7½-ounce		8.00	@
40—8-ounce		8.10	@
40—10-ounce		9.15	@
40—10½-ounce		9.25	@
45—7½-ounce		8.85	@
45—8-ounce		9.10	@
48—10-ounce		11.25	@

EGYPTIAN COTTON CROP MOVEMENT.

FROM AUGUST 1 TO MARCH 14, 1917.

To—		1916-17.	1915-16.	1914-15.
Liverpool	bales	155,783	177,727	153,380
Manchester		109,836	117,380	125,420
Total shipments to Great Britain		265,619	295,107	278,800
To—				
France	16,413			
Spain	10,061	26,474	44,609	30,379
Italy	25,023			
Switzerland	14,899			
Norway	Nil	39,922	33,718	127,848
Sweden	Nil			
Russia		22,261	34,609	32,330
Greece		65	50	1,869
Total shipments to Continent		88,722	112,986	192,426
To—				
United States		105,215	173,033	107,081
India	100			
Japan	9,105	9,205	18,010	10,893
Total shipments to all parts		468,761	599,136	589,200
Total crop (Interior gross weight), cantars		4,726,518		6,473,726

(Compiled by Davies, Benachi & Co., Liverpool.)

RUBBER IN AIRCRAFT CONSTRUCTION.

IN a lecture recently delivered before the Aeronautical Society, London, Captain G. S. Walpole remarked that materials, other than metal, used in aeronautics were less satisfactory, owing to the fact that they are more easily influenced by time, temperature and humidity, and that the best results cannot be obtained with the same directness and precision of forecast.

He showed that in such rubber parts as shock-absorbing devices and tires in airplanes, not only shape, size and arrangement were to be considered, but also the composition and properties of the material. In this connection, he complained of the lack of co-operation between rubber manufacturers and aircraft designers, instancing the ignorance of manufacturers as to the work required of shock-absorbers. The ideal shock-absorber, he asserted, should be like a "pudding," which gives to a load and slowly resumes its shape. Steel springs are unsuitable, because when loaded, they "hit" back at once. He also considered the possibility of obtaining increased shock-absorbing power from shock-absorber rings by employing different rubber mixtures, discussed the use of rubber for conveying petrol, oil, and hot water, and described the rubber-proofing of fabric for balloons. Tests of airplane tires were shown on slides, one wheel having been loaded to 5 tons, which caused the spokes to collapse, but did not affect the tire.

In dealing with other materials, he discussed the development of the waterproof form of "fiber," and remarked that the ordinary form is not isotropic, but has markedly different properties towards humidity in two directions at right angles to each other —a quality to be carefully watched in magneto work.

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

NEW YORK.

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WITH the declaration of war came the uncertainty as to what the Government will require in base metals. Pig lead has been in great demand and sellers have adopted a waiting policy. The inactivity in copper is due to buyers holding off for future developments. Spelter continues to be weak and prices have declined. The antimony market has been dull and prices steady.

The shipping difficulties that have beset the foreign and domestic rubber chemical trade for some time have continued during the past month. There has been a good demand, the many inquiries received by the dealers during April showing that buyers are wisely anticipating future requirements.

CHINA CLAY. The steady call, limited supplies and freight difficulties have resulted in advanced prices for this material.

GLUE. All the various grades are in demand and higher prices have been recorded during the month.

HEXAMETHYLENE TETRAMINE. This organic vulcanizing accelerator has advanced 5 cents a pound since our last report.

LEAD PIGMENTS. Red oxide, sublimed blue and white lead, basic carbonate, basic sulphate litharge and orange mineral have all advanced, due to the strong position of pig lead.

LITHOPONE. The market for this material has been firm with small supplies available, and producers are well sold ahead. Spot stocks of both domestic and foreign grades are limited.

TALC. The strong position of both domestic and foreign grades and the steady demand is reflected in advanced prices.

SULPHUR. The strong position of brimstone has resulted in a sharp advance in all grades of sulphur. Flour is now quoted $2.90 per hundredweight.

VERMILIONS. All grades are in demand and supplies limited. English vermilion is now quoted $2 a pound.

ZINC OXIDE. There has been a good demand during the month and many inquiries for future positions have been noted. The new schedule for French process grades that went into effect April 1, shows a decline of about 2⅛ cents a pound in prices quoted last month. There has been no change in the American grades.

NEW YORK QUOTATIONS.

APRIL 26, 1917.

Subject to change without notice.

Accelerene	*lb*	$2.62	@
Acetone (drums)	*lb.*	Nominal	
Acid, acetic, 28 per cent. (bbls.)	*lb.*	.04½ @	.05
cresylic (crude)	*gal.*	1.00 @	
glacial, 99 per cent (carboys)	*lb.*	.28 @	.30
muriatic, 20 degrees	*lb.*	.01¾ @	
nitric, 36 degrees	*lb.*	.05¾ @	
sulphuric, 66 degrees	*lb.*	.01¾ @	
Aldehyde ammonia (crystals)	*lb.*	1.00 @	
Aluminum Flake (carloads)	*ton*	24.00 @	
Ammonium carbonate	*lb.*	Nominal	
Antimony, crimson, sulphuret of (casks)	*lb.*	.50 @	
crimson, "Magmetco"	*lb.*	Nominal	
crimson, "Mephisto" (casks)	*lb.*	.51 @	
golden, sulphuret of (casks)	*lb.*	.28 @	
golden, "Magmetco"	*lb.*	Nominal	
golden, "Mephisto"	*lb.*	.30 @	
golden, sulphuret, States brand, 16-17 per cent.	*lb.*	.28 @	
red sulphuret, States brand	*lb.*	.25 @	
vermilion sulphuret	*lb.*	.60 @	
Asbestine (bags)	*ton*	17.00 @	20.00
Asbestos (bags)	*ton*	35.00 @	50.00
Barium sulphate, precipitated	*lb.*	.04 @	
Barytes, pure white	*ton*	30.00 @	35.00
off color	*ton*	17.50 @	24.00
Basofor	*ton*	80.00 @	
Benzol, pure	*gal.*	.55 @	.60
90 per cent.	*gal.*	.55 @	.60
Beta-Naphthol (f. o. b. New York)	*lb.*	.95 @	
Brown oxide of iron	*lb.*	.01½ @	.02
sienna, raw and burnt	*lb.*	.06 @	.12
umber, raw and burnt	*lb.*	.05 @	.06
ochre, domestic	*lb.*	.02 @	.02½
imported	*lb.*	.03½ @	.04
Bone ash	*lb.*	.10 @	
black	*lb.*	.06 @	.15
Cadmium tri-sulphate (f. o. b. London)	*lb*	2.49 @	
sulphide, yellow	*lb.*	2.15 @	2.25
Cantella gum	*lb.*	.33 @	
Carbon, bisulphide (drums)	*lb.*	.05 @	.06½
black (cases)	*lb.*	.25 @	.35
tetrachloride (drums)	*lb.*	.15 @	.18
Caustic soda, 76 per cent.	*lb.*	.04¾ @	.05
Chalk, precipitated, extra light	*lb.*	Nominal	
precipitated, heavy	*lb.*	.05 @	
China clay, domestic (powdered)	*ton*	20.00 @	25.00
imported (powdered)	*ton*	40.00 @	50.00
Chrome, green	*lb.*	.14 @	.45
yellow	*lb.*	.23 @	.25
Cotton linters	*lb.*	.07¼ @	
Excellerex		.85 @	
Fossil flour	*lb.*	.03 @	.05
Gas black (cases)	*lb.*	.25 @	.35
Gilsonite	*ton*	40.00 @	
Glue, high grade	*lb.*	.40 @	.70
medium	*lb.*	.30 @	.40
low grade	*lb.*	.18 @	.28
Glycerine, C. P. (drums)	*lb.*	.56 @	.58
Graphite, flake (400 pound bbl.)	*lb.*	Nominal	
amorphous	*lb.*	Nominal	
Green oxide of chromium (casks)	*lb.*	.80 @	.85
Ground glass (fine)	*lb.*	Nominal	
Hexamethylene Tetramine (powdered)	*lb.*	.75 @	.80
Indian red, reduced grades	*lb.*	.04½ @	.07½
pure	*lb.*	.09 @	.10
Infusorial earth, powdered	*ton*	60.00 @	
bolted	*ton*	65.00 @	70.00
Iron oxide, red, reduced grades	*lb.*	.02½ @	.05
red, pure, bright	*lb.*	.12 @	.14
red, excelsior	*lb.*	.18 @	
Ivory, black	*lb.*	.06 @	.10
Lampblack	*lb.*	.05 @	.12
Lead, red oxide of	*lb.*	.11 @	.11½
sublimed blue	*lb.*	.09¼ @	
sublimed white	*lb.*	.09¼ @	
white, basic carbonate	*lb.*	.09¾ @	.10¼
white, basic sulphate	*lb.*	.09¼ @	
black hyposulphite (Black Hypo)	*lb.*	Nominal	
Lime, flour	*lb.*	.01¼ @	.02
Litharge, domestic	*lb.*	.10¼ @	.11
English	*lb.*	.12 @	.13
sublimed	*lb.*	.10¾ @	
Lithopone, imported	*lb.*	.10 @	.14
domestic	*lb.*	.06½ @	.07
Beckton white (carloads)	*lb.*	Nominal	
Magnesia, carbonate	*lb.*	.11 @	.13
calcined, heavy	*lb.*	.10½ @	.11
heavy, Thistle Brand	*lb.*	.12 @	
light	*lb.*	.45 @	.50
Magnesite, calcined, powdered	*ton*	60.00 @	70.00
Mica, powdered	*lb.*	.03½ @	.05
Mineral rubber	*lb.*	.02 @	.05
"M. R. X."	*ton*	100.00 @	
"Genasco" (carloads)	*ton*	Nominal	
"Pioneer"	*ton*	Nominal	
"Richmond Brand"	*lb.*	.03 @	
"No. 64 Brand"	*ton*	40.00 @	
"Refined Elaterite"	*lb.*	.05 @	
"Rubrax"	*ton*	Nominal	
Naphtha, stove gasoline (steel bbls.)	*gal.*	.24 @	
66@68 degrees (steel bbls.)	*gal.*	.29 @	
68@70 degrees (steel bbls.)	*gal.*	.30 @	
V. M. & P. (steel bbls.)	*gal.*	.21 @	
Oil, aniline	*lb.*	.32 @	
corn, refined (Argo)	*cwt.*	16.51 @	
linseed (bbl.)	*gal.*	1.21 @	
palm	*lb.*	.14½ @	.15
paraffin	*gal.*	Nominal	
pine (cases)	*gal.*	.58 @	
rapeseed, blown	*gal.*	1.35 @	1.40
rosin	*gal.*	.37 @	.67
tar (cases)	*gal.*	.22 @	
soluble aniline colors, yellow, orange	*lb.*	2.50 @	
Orange mineral, domestic	*lb.*	.13 @	.15
Paragol (carloads)	*cwt.*	.11 @	.14
Petrolatum	*lb.*	.05½ @	
Petroleum grease	*lb.*	.03½ @	
Pine solvent		None	
Pine tar	*bbl.*	Nominal	
Pitch, burgundy	*lb.*	Nominal	
coal tar	*bbl.*	4.50 @	
pine tar	*lb.*	Nominal	
Plaster of paris	*lb.*	1.50 @	1.70
Prussian blue	*lb.*	.75 @	.90
Pumice stone, powdered (bbls)	*lb.*	.03 @	.04
Resin, Pontianak, refined	*lb.*	None	
granulated	*lb.*	None	
fused	*lb.*	None	
Rosin (500 pound bbls.), @ 280 lbs.	*bbl.*	5.95 @	8.50
Rotten stone, powdered	*lb.*	.02½ @	.04
Rubber black	*lb.*	.06 @	
Rubber substitute, black	*lb.*	.09½ @	.13½
white	*lb.*	.14 @	.18
brown	*lb.*	.13½ @	.18
Rubhide		.35 @	
Shellac, fine orange	*lb.*	.63 @	.65
Silex (silica)	*ton*	24.00 @	35.00
Soapstone, powdered	*ton*	.12 @	.15
Starch, corn, powdered	*cwt.*	4.97 @	
Sulphur chloride (drums)	*lb.*	.08 @	.09½
Sulphur, flour, velvet, brand (carloads)	*cwt.*	2.90 @	2.95
Bergenport flour	*cwt.*	2.85 @	3.25
Talc, American	*ton*	12.00 @	20.00
French	*ton*	24.00 @	35.00
Toluol, pure	*gal.*	1.75 @	2.00
Tripolite earth, powdered	*ton*	60.00 @	
bolted	*ton*	60.00 @	
Turpentine, pure gum spirits	*gal.*	.51 @	.51½
wood	*gal.*	.48 @	
Venice	*gal.*	.18 @	.20
Ultramarine blue	*lb.*	.25 @	.45
Vermilion	*lb.*	.70 @	.80
Chinese	*lb.*	.95 @	1.00
English	*lb.*	2.00 @	
Wax, beeswax, white	*lb.*	.58 @	.62
ceresin, white	*lb.*	.12 @	.20
carnauba	*lb.*	.36 @	.55
ozokerite, black	*lb.*	.55 @	.60
green	*lb.*	.75 @	.78
montan	*lb.*	.33 @	.35
paraffin, refined 118/120 m. p. (cases)	*lb.*	.09 @	
123/125 m. p. (cases)	*lb.*	.09½ @	
128/130 m. p. (cases)	*lb.*	.10½ @	
133/136 m. p. (cases)	*lb.*	.12 @	
yellow, 124/126 m. p. (bbls.)	*lb.*	.07¼ @	
Whiting, Alba	*cwt.*	1.00 @	1.25
commercial	*cwt.*	1.00 @	
gilders	*cwt.*	1.00 @	1.25
Paris, white, American	*cwt.*	1.25 @	
English cliffstone	*lb.*	.01½ @	.02
Wood pulp XXX (carloads)	*ton*	Nominal	
Yellow ochre	*lb.*	.03½ @	.04
india rubber	*lb.*	1.50 @	
Zinc oxide, American process, horsehead brand			
"XX red"	*f. o. b. factory lb.*	.10 @	
"special"	*f. o. b. factory lb.*	.10½ @	
French process, red seal	*f. o. b. factory lb.*	.15½ @	
green seal	*f. o. b. factory lb.*	.15⅝ @	
white seal	*f. o. b. factory lb.*	.16⅛ @	
Zinc substitutes	*ton*	30.00 @	
Zinc sulphide, pure	*lb.*	Nominal	

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